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THE COLOR COMPUTER MONTHLY MAGAZINE

April 1991 Vol. X No. 9

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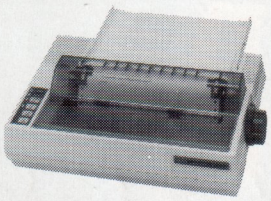

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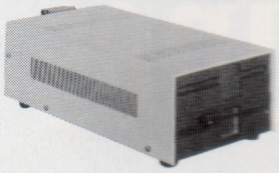

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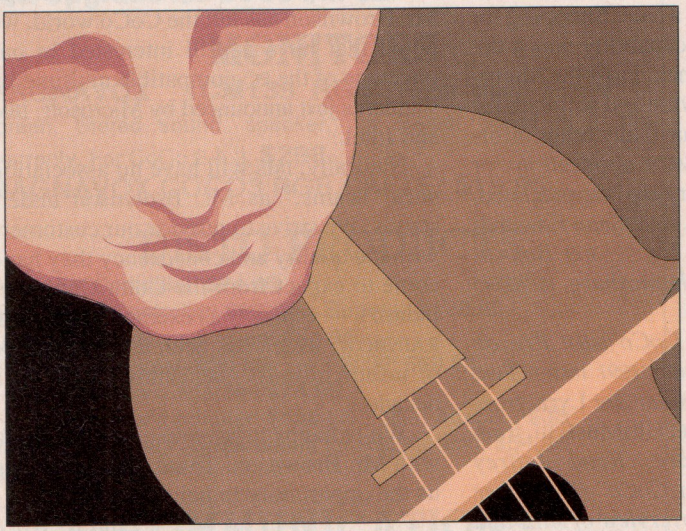

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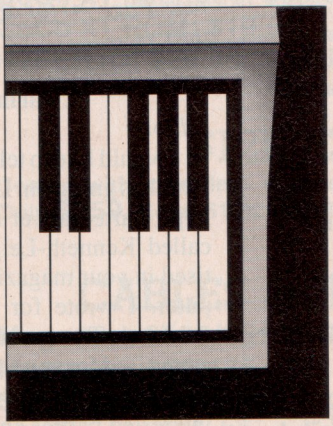

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Letters to the RAINBOW

A Sound Situation

Editor:

Over the last couple of years, I have been building a MIDI music studio. My ESQ-1 Keyboard (ENSONIQ) has a built-in sequencer, but editing is a pain. Shopping for computers with MIDI capability was a depressing adventure. Then, I saw the Microcom ad for MIDI hardware and software for the CoCo 3. Do you have any other information on CoCo 3 MIDI applications or product reviews? Your help is appreciated.

Sean Edwards
P.O. Box 105
Mechanicsburg, IL 62545

See the review of CoCo MIDI Pro on Page 74 of the February 1991 issue. Two other products to consider are Lyra, *from Rulaford Research, and* UltiMusE III, *from Second City Software. Read Jeffrey Parker's "Play it again, CoCo" (December 1989, Page 74) for an overview of MIDI and the CoCo.*

Clearing the Air

Editor:

I would like to tell you about a scam that I think is going on. Last spring when all the hype started about a CoCo 4, a company called Kenneth-Leigh Enterprises advertised in your magazine about its new computer. I wrote for information, which I received. There was a special newsletter advertised for $9.95, which was supposed to start in July. The newsletter was to inform interested parties about updates, new software, and so on. I never received anything, but they cashed my check. I wrote several months ago asking for a refund. I have since bought a Tandy 1000 TL/2 and subscribe to PCM, so now I don't want the newsletter. I did not get any reply, nor did I receive a refund.

Kenneth C. Brownson
Newark, Delaware

THE RAINBOW's advertising manager, Ira Barsky, contacted Kenneth-Leigh Enterprises (now known as Interactive Media Systems). Following is IMS' reply:

Dear Ira:

It was with great pleasure that Interactive Media Systems, Inc., received your fax concerning Ken Brownson's order for our newsletter. It shows once again that THE RAINBOW, like IMS, is dedicated to customer service.

After a very pleasant and productive chat with Mr. Brownson, I asked our North Carolina offices to send Mr. Brownson a refund and a free subscription. Even though Mr. Brownson has left the CoCo world, we noted that he was still interested in our coverage of the PC-compatible multimedia standards just announced by Microsoft, IBM and Intel.

Naturally, IMS will have no association with "scams," as Mr. Brownson understands. We strive to provide our customers with the quality and consistency they have come to expect from the Color Computer industry — espcially as exemplified by THE RAINBOW, which has been the best source of information for the Tandy CoCo for a decade.

We're happy to have resolved this snafu with Mr. Brownson. Thank you for giving us the opportunity to help out, Ira.

Paul K. Ward
President
Interactive Media Systems, Inc.

Programmers Take Notice

Editor:

I spend a lot of time entering listings from THE RAINBOW and, like many others, I have difficulty with the 3-column listings. But I can accept this if it means more listings per issue.

However, I suggest that programmers could make things easier for readers who have difficulty entering the smaller listings if they would avoid the use of "I" and "Q" as variable labels. These are not easy to distinguish from "1" and "O".

Keiran Kenny
Cremorne, NSW, Australia

Kudos

Editor:

I would like to publicly thank Mr. Tom DiMarco of Gimmesoft for the fine service he gave me during the holidays. He called me at home to tell me he was temporarily out of a certain program I had ordered for Christmas. He then went out of his way to ship a substitute by Express Mail so I would receive it by Christmas. This is truly outstanding service.

Two other RAINBOW advertisers are also worthy of mention: Computer Plus and Dayton Associates. I recently ordered products from both and in each case had the items in my hands less than 48 hours after

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calling in the order. That's fast! (Though, UPS also deserves some of the credit.)

In this period of declining support from Radio Shack, we in the CoCo Community are very fortunate to have such excellent mail-order companies supporting us. There is no reason to fear ordering from any RAINBOW advertiser. Over the past few months I have purchased over a thousand dollars worth of hardware and software for my Color Computers from RAINBOW advertisers, large and small, and in every case the service was courteous, helpful, and very prompt. RAINBOW advertisers deserve our support!

I know a lot of people gripe about the shrinking size of the magazine, the different binding, and the smaller type for the listings. I just want you to know that I think you are doing a fantastic job in the face of declining advertiser revenue. Let's face it, we are in the twilight of the Color Computer era. All magazines for the Commodore 64/128 have passed from existence. *Incider* for the Apple has a subscription base over four times as large as that of THE RAINBOW (I checked), yet the magazine is even thinner and not nearly as informative. Of course, people who bought other computers aren't nearly as intelligent as we CoConuts . . .

Thomas Fann
Akron, Ohio

Thanks for the kind words and the realistic understanding of our position.

Graphically Speaking

Editor:

Is there a way to scroll text over a Hi-Res picture without affecting it? How can I save pictures in memory and then use them to make animation?

Raul Guido Rosey
Box 402
Boqueron, Puerto Rico 00622

We know of no easy *way to scroll text over graphics without disturbing the image. However, several articles have appeared in past issues that offer insight into various methods you can use for this, as well as for graphics animation.*

Computer Expo

Editor:

I am the president of the Modem Support Group (M.S.G.) of Michigan and have the privilege of overseeing the telecom activities of this year's MAXIT Computer Show. MAXIT (Michigan Annual Expo of Information Technology) is sponsored each year by the Michigan Computer Consortium (organization membership consists of area computer clubs). Our computer shows began in 1986. The best attendance to date has been 5,000. We hope to exceed that number for this year's show. Our mid-Michigan area Tandy Color Computer and OS-9 users are participating in MAXIT '91.

MAXIT '91 will be held on Sunday, April 21, from 10 a.m. to 5 p.m. at the Clarion Hotel in Lansing, Michigan. General admission is $3. Children 12 and under are admitted free. For more information, contact Skip Osterhus, P.O. Box 6452, East Lansing, MI 48826, or call the MAXIT Voice Hotline by dialing (517)-487-6180 (use voice mailbox 629).

John C. Evans, Jr.
Lansing, Michigan

Interested in Ham Radio

Editor:

First, I would like to add my thanks to THE RAINBOW for your 10 years of programs, articles, and product reviews. You have helped this reader become computer literate. Also, my thanks to the many advertisers who support our little jewel — especially Microcom Software (it's a shame more of your readers don't live as close as I do to meet these fine people in person) and T&D Subscription Software, whose service is always excellent.

Also, can anyone help me find public domain software for amateur radio? I am interested in any programs for either Disk BASIC or OS-9, with emphasis on using the CoCo 3 to receive CW via software and a simple cable interface. I would gladly pay for the media, either tape or disk. Thanks again RAINBOW!

Ed Howell
1102 Leicester Road
Caledonia, NY 14423

Something for Any Occasion

Editor:

Somebody once said "Never judge a book by its cover." I don't know who it was, or what type of books were being talked about, but when it comes to THE RAINBOW the saying should be changed to; "never judge the magazine by its size." As I renew my subscription for another year I'd like to explain what I mean.

I have continuous issues of the magazine dating back to January 1985. In every issue there has been some article, program, or letter that has taught me something new about my CoCo, or about writing programs for it. When I upgraded from a CoCo 1 to a CoCo 3, the information was there. The information was also there when I went to 512K, when I changed disk drives, when I added a hard disk, when I modified a Multi-Pak, when I started using OS-9, and when I joined Delphi. As far as I know, there isn't another computer magazine that can walk a person through changes and upgrades like this without any other form of help.

There's still a world of things I want to do with my CoCo and I know I can count on THE RAINBOW to help me learn to do them. Although THE RAINBOW has lost a few pages since January 1985, it's still packed full of information and ideas that can't be found with any other single source. And, for anyone who thinks it's strange to hold on to back issues like I do, there's an article in the January 1985 issue about C programming that I still haven't read. But when I'm ready, it'll be there.

I don't know how you've kept the subscription price unchanged for so long, but here's my check for another year of this fine magazine. And I'm sure I'll be doing the same thing in another year. You know, THE RAINBOW really could have been called The Diamond, because it's a true gem among computer magazines.

Robert W. Kemper
Ft. Stewart, Georgia

Thanks — we needed that!

Serial/Parallel Dilemma

Editor:

I recently purchased a parallel printer and have no way to connect it to my CoCo 3. (I am currently using a serial printer.) I have heard there is a converter available that allows this, but no one has been able to tell me where I can get one. The parallel printer is a Wright Hand 1200L printer. I have the cable for the printer, but as you know the CoCo 3 only has a 4-pin connector for an output. The cable for this printer has 25 pins. This is where I need the converter. What can you do to help me?

Donald H. Taylor
20 S. Miriam Street, #2
Claycomo, MO 64119

A serial-to-parallel converter can be used to change the serial data coming from the four-pin port on the CoCo's backside to a parallel form. Such devices are available from a number of RAINBOW advertisers, including Dayton Associates, Microcom Software and Supersoft.

The Search for Flippies

Editor:

This is in response to the letter from Roger Rance, which appeared in the January 1988 issue of THE RAINBOW. Like Roger, I had difficulty finding flippy disks. In fact, several dealers (including one Radio Shack store) insisted that there was no such thing. Others would correct me and say, "oh, you mean floppy disks!"

A company that used to advertise in THE

Continued on Page 76

COCO SOFTWARE /BOOKS CATALOG

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Print#-2

CoCo Hits a High Note

I have always been sort of addicted to music and sounds. Unfortunately, music (but, perhaps, not sounds) has never been addicted to me.

My mother could sing pretty well — or at least I thought so — and encouraged "family sing-alongs" in the car when traveling. My father was not much of a singer and was known chiefly for his rendition of "I'm Forever Blowing Bubbles", which (fortunately) was usually voiced in a humorous vein.

Mother decided, of course, that *I* was an outstanding singer and, after appropriate consultation with school authorities, enrolled me in private singing lessons with Miss Bessie Rice, well-known in Birmingham, Alabama (where I grew up), as a wonderful teacher of voice.

I was about 12 and a "child soprano," as my mother and Miss Bessie put it. My school selected me as its representative to the All County Chorus. And one year I sang with other kids in front of a whole lot of people.

Lessons from Miss Bessie were two days a week. Mother dropped me off, went home for 45 minutes or so, and came to get me. During my hour, Miss Bessie played the piano and I sang songs she (or sometimes I) wanted me to sing. I even practiced some at home.

One fateful day about this time of year, the beginning of spring when the sap was starting to rise, Miss Bessie was leading me through "I Believe" when I got to the part where I was supposed to sing "I believe" three times, each one a little higher in pitch than the last. I didn't make it through the last one. My voice cracked.

Miss Bessie stopped playing, got up from the piano, went to the telephone, and called my mother.

"You might as well come and get him," she said. "His voice is changing."

I never saw Miss Bessie again.

I was never asked to sing in public again, either.

However, I have never fully convinced myself that I cannot sing and have always liked to make music. For that reason, music on the Color Computer has always held me in fascination.

I think sometimes we see these programs, of which there are several, in THE RAINBOW and think they are for "musicians" who compose their own songs. This, of course, is true and there are a lot of musical talents out there who do, indeed, write music on the CoCo.

I cannot write music, either. But I like to play it and sing along. And, really, all it takes is a song book, a CoCo, and one of the music programs offered by a number of people on these pages.

Cecil Houk, as you know, opens all of our RAINBOWfests with "The Star Spangled Banner." While Cecil is a musician who has "arranged" our national anthem, I have successfully duplicated it in a simple one-voice song which sounds pretty good. Moreover, it was fun to do.

Unfortunately, the family of which I am the father takes an even dimmer view of my singing than the family of which my father was the father. So there are not many sing-alongs. Still, now and again, the songs that are family favorites get keyed in and *I* have a fine time singing with the computer.

I honestly think this is an enjoyable use which may have been overlooked in computer music. And maybe it is one your family might like to explore. Best of all, you can have all your favorite songs on a disk and just go from one to another.

And CoCo can still hit the high Cs in "I Believe."

— Lonnie Falk

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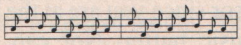
A CoCo 3 remake of a popular music program

Resounding CoCo



by George Quellhorst

Ever since our family has had a Color Computer we've made music with it. Each music processor we acquired was tried, examined, and finally put aside to be replaced once again with the *Music+* program first published in the June 1984 issue of THE RAINBOW (updates appear in the 1986 and 1987 June issues). We did not replace *Music+* until we bought a third-party music processor. For a while everyone in our house was happy. But, alas, the time came when I wanted to enter a song called "Elvira Madigan," and our commercial processor did not have the range required for this song. So, back we went to the good old standby, *Music+*. It did have the required range, but entering a complicated piece of music was an almost impossible task, especially with the small five note window. It was at this point that my son jokingly remarked that perhaps I should write a new screen editor for *Music+* using the Color Computer 3's HSCREEN. After some serious thought I decided to give it a try, although I did not think at the outset BASIC would be fast enough to do the job, or that enough memory would be available. After six months of "spare time," and some tricky programming, the task was accomplished. "Elvira Madigan" was entered, and any bugs that may have been left in the new music editor were quickly found and fixed.

The result of my effort is *Music3+*, a screen editor for *Music+* that uses HSCREEN 4. It is very user-friendly and uses real notes, not numbers or letters. It has a 17-column, 68-note window, does everything *Music+* does, and sports a few other added features. You can Play starting from the cursor position, Move-Play with a start and end input, and Copy to the end and/or *middle* of your music file. *Music3+* is fully compatible with *Music+*. Any *Music+* file can be loaded into *Music3+*.

An "on HSCREEN," ON ERR GOTO routine was added (mainly for Disk I/O) to prevent the computer from leaving the HSCREEN and ending the program. For example, if you enter a non-existing filename, the program allows you to enter another filename without having to run the program again.

Two additional bonuses are the added machine-language routines for Insert and Delete. The original BASIC program took 2½ minutes to delete or insert the first column of notes in a 1200-column file. Since I had never written a machine-language program before, I got William Barden Jr.'s book, *TRS-80 Color Computer Assembly Language Programming*, off the shelf and managed to write the two routines. Now it takes less than ¼ second to insert or delete the first row of notes in a 1200-column file. The machine-language routines are loaded in memory just below the existing CLEAR routine. The CLEAR statement in Line 1 was changed from &H4CBF to &H4C8B to make room for the added routines.

Another "goodie" is the playback of music in the high-speed mode of the Color Computer 3. It doubles the sampling rate of the synthesizer to the DAC converter. This doubles the frequency response of the computer and makes the final result sound 100 percent better. Your music sounds even better if you install a speaker output jack in your monitor and use a better speaker to play your creations. Better yet, run the audio signal to a stereo system.

Playback in the high-speed mode raised the pitch of the music by an octave. To remedy this, the note table (which is poked into memory as the program is loaded) had to be changed. One octave was removed from the top of this table. The values needed to add a lower octave were calculated and added to the bottom of the table, thus lowering the pitch of the synthesizer by one octave. Unfortunately, this process created an incompatibility with existing *Music+* files. When they are played with *Music3+*, they sound one octave higher than they should be since the note table is saved to the disk along with the music. To make everyone happy, and to keep the two programs fully compatible, I added a conversion utility. To convert your old files, simply load them into *Music3+* and press F2. The new note table is poked into your old song, the tempo is divided by two, and the new value is poked in as a permanent part of the song. The whole process takes less than two seconds. Now save the song to disk and the conversion is complete. It does no harm to convert a song more than once. However, an error-trap routine prevents you from converting the same song twice. When you press F2, the program checks if the correct note table is in memory. If so, the warning buzzer sounds and nothing else happens.

Finally, I added Directory and Drive Change commands. Pressing 0, 1, 2, or 3 while at the Main menu sets the drive specified and displays the directory with the free granules in five columns on the 80-column screen. A POKE 59078,51 preserves the HSCREEN. Pressing any key on the keyboard instantly puts the HSCREEN with your music back on your screen.

Since I received the dreaded Out of Memory error while working on this program, I made two compromises. First, all the values in the DATA statements were

---

George Quellhorst has had a CoCo since the days of 4K. He has two CoCo 2s and a CoCo 3 with an RGB monitor. He enjoys writing programs with his computer equipment. He can be contacted at 63 S. State Street, Apt. 10, Painesville, OH 44077.

converted to Hexadecimal, saving 299 bytes of memory. Also, all the REM statements were removed, which saved another 812 bytes for a total of well over 1K of memory space. For those who might be interested, the REM statements are shown in Figure 3.

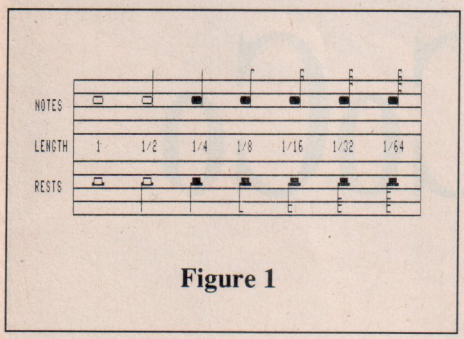


Figure 1

Entering the Program

For those of you who do not receive RAINBOW ON TAPE or RAINBOW ON DISK, a few notes are in order before you start entering the listing. The funny looking character in Line 37, immediately after `TI=INT(128/2,` is called a *caret*. This character is generated by pressing the up-arrow key. The lower case g in Line 11 must be entered by pressing the F1 key, and the reversed slash in Line 57 is generated by holding SHIFT and simultaneously pressing the CLEAR key.

Using *Music3+*

The following information is printed on the screen at all times: Tempo, drive number, current memory location (which informs you where in the music memory the cursor is located), high memory indicator (which shows the highest memory location the cursor has reached), cursor note (printed in red), and number of the last note in the file. *Music3+* allows a total of 2498 columns. A single note consumes five memory locations, one for the length of the note and one for each voice. Therefore, the note counter advances or decreases by one when the cursor is moved right or left, while the memory location counter advances or decreases in increments of five. *Music3+*'s buffer starts at 20258, which is the number printed on your screen as the current memory location when no music file is in memory.

I inadvertently pressed BREAK several times while trying to press the up arrow, so I disabled the BREAK key by poking a value of 255 into address 41598. (SHIFT-BREAK still works.) The BREAK key is restored to normal each time you press SHIFT-BREAK. Pressing SHIFT-BREAK and running the program again does not erase the music in memory.

Music3+ has two menus. The Main menu is displayed when *Music3+* is run for the first time. The second menu is the Music Entering menu. The two menus can be toggled by pressing F1. This does not, however, switch to the music scoring part of the program.

Entering Music

Automatic key-repeat is always in effect for the four arrow keys. Music is entered with the help of the cursor, which looks like an equal sign (=). It is located at the far left side of the screen at the middle C position. Notice you can move the cursor up and down, but not to the left or right. You cannot, at this time, enter music to the left of the cursor since you are at the beginning of the music buffer. Nor can you enter music to the right of the cursor, since you have not yet entered music at the current cursor location. The rule is that the cursor cannot be moved further to the right, or higher in memory, until a note or rest has been entered at the current location. This is to prevent you from accidentally leaving a blank spot in the music memory, which signals the computer that the end of the music file has been reached.

Press F1 to switch menus (not necessary, but it helps) and move the cursor to the position on the music bar where you plan to enter a note. As you move the cursor to the top or bottom of the screen, little help lines are drawn on the screen to help you locate the desired note position. This only happens when the up or down arrows are pressed. The lines drawn by the cursor remain on the screen until you have entered a note or rest and pressed ENTER, after which only those extra lines that are needed remain on the screen. Press the space bar to set the cursor position. Once you are in the music entering mode, the cursor position cannot be changed.

As soon as you press the space bar, a blinking quarter note is drawn on the screen at the cursor position. (See Figure 1 for note lengths.) Using the left and right arrows, you can change the length (duration) of this note. The left arrow decreases the duration of the note and the right arrow increases it.

The arrows also have a wrap-around feature. For example, when a 1/64 note (the shortest note available) is displayed on the screen, pressing the left arrow causes it to be changed to a whole note. Conversely, pressing the right arrow while a whole note is displayed changes it to a 1/64 note. Common note values are carried through, making it easy to enter repeated note lengths. In other words, the next time you press the space bar, the last note length used is drawn. The last note displayed on the screen becomes the immediate default after loading a music file. Since all four notes in a single location must be the same length (the computer cannot play a whole note and a quarter note at the same time), all note lengths in a single row or location are changed to the value of the note displayed after pressing ENTER. See Figure 2 for an example of this.

Pressing CLEAR while a flashing note is displayed on the screen erases or clears that note and returns you to the Main menu. Note that if you clear the last note in a column using the CLEAR key, a rest is printed in place of the cleared note since a column cannot be empty. The same thing happens when you insert a note.

Sharps and Flats

Before pressing ENTER, but while the note is still blinking on the screen, press F1 to insert a flat sign in front of the note, making that note flat. Similarly, press F2 to insert a sharp sign. The down arrow erases either a flat or a sharp.

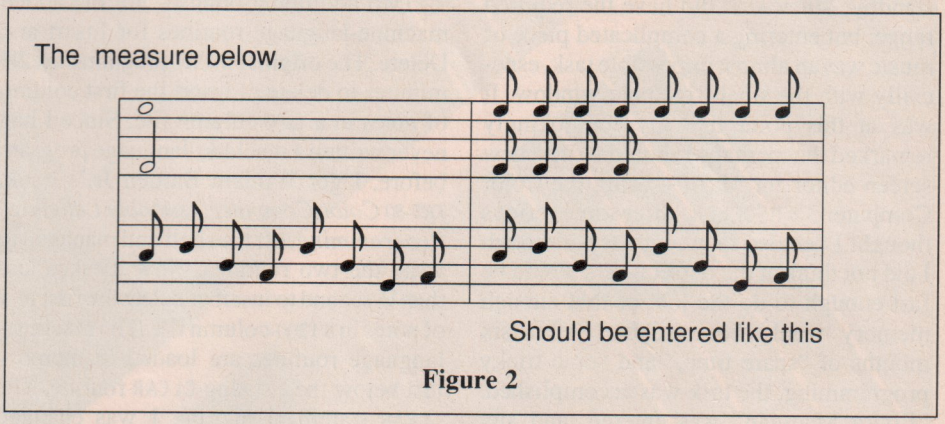


Figure 2

To change a note from flat to sharp, you do not have to erase the current sign first. To change a flat to a sharp, simply press F2 and vice versa.

There are a few things you should know about how the computer handles sharps and flats. The computer cannot distinguish the difference between a C sharp or a D flat since they are both the same note. Therefore, the same number is put in memory for both notes and all flats are treated as sharps by the computer when the notes are drawn on the screen. If, for example, you enter a

D-flat, the computer automatically changes the note to a C-sharp as soon as you press ENTER.

A word of caution: There is no such thing as a C-flat. Therefore, should you insert a flat in front of a C, the computer prints a B on the screen instead. However, since a C-flat is indeed a B, the program did give you what you asked for. The same thing goes for sharps. For example, if you enter an E-sharp, the computer changes it to an F.

Press ENTER for two entire rows of notes to be read by the computer. It checks for sharps, flats, and rests as well as records the length of the last note entered. These numbers, as well as the note length, are immediately poked into memory. The entire row of notes is erased by using a simple HGET/HPUT routine. The row of notes is redrawn to the screen using the values previously poked into memory. While it does this, all unnecessary lines that might have been drawn by the cursor are erased. The program checks the distance between adjacent notes and does not print any flags on a note if the stem of this note touches the bottom of the note printed immediately above it. Afterwards, control is returned to the main menu and you may reposition the cursor for the next note.

Rests

As shown in Figure 2, a note and a rest cannot be printed or stored in memory in a single column. If you have less than four notes in a single column, the computer automatically adds the rests. Pressing the space bar while the cursor is in a column containing a rest erases the rest, and a blinking note is printed at the cursor position. To enter a rest, press R while a blinking note is on the screen. This causes all notes in that particular column to be erased, and a rest is printed in the middle C position of that column. The length of the rest may be manipulated in the same way you changed the length of a note. Also, should you press the letter N while a rest is blinking on the screen, the rest is changed to a note of equal length. A rest is always printed at the middle C location.

If you enter more than four notes in a single column, the last note entered is erased and the program returns to the main menu. You do not have to enter the notes one column at a time. The computer always knows where the cursor is located. You may enter the entire top or bottom row first, move the cursor back to the left, and enter another row of notes or rests. Also, you can jump to any location within the music file and make changes and/or additions.

The Main Menu

As you may have noticed, the bottom part of the screen contains a window in which all prompts and error messages are printed. It is in this window that you enter any additional information the program requires. I will go over each menu item and give a brief explanation of how it works. Every prompt asking you to enter information can be aborted by pressing ENTER, but only when the prompt is displayed. When more than one entry is required, you may abort at each prompt by pressing ENTER.

Load and Save

The program loads and saves only with disk. The INPUT for the filename does not accept more than eight characters, and an automatic .BIN extension is given to each program. You cannot load a file when another file is already in memory. A warning buzzer sounds and the input prompt is not displayed in the window.

The same rule applies when you try to save a file and there is no file present in memory. You do not have to return to Column 1 to save a file. You may do so at any time regardless of where the cursor is located.

A tick is heard about once a second during all computer operations requiring a

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Move

All the numerical input functions, with the exception of tempo and waveform, have a four-digit limit. (Tempo and waveform have a three-digit limit.) Should you try to enter too many digits, the computer ignores your efforts. The Move function allows you to play a section of music without playing the whole song. You are prompted for a starting and ending column number. You can play as little as one column, or the entire song. You cannot play the song backward, though. If the second column number specified is smaller than the first, the buzzer sounds and you are prompted to try again.

Jump

This allows you to jump to another memory location. If, for example, you enter 123, the screen clears and is redrawn with the 123rd column appearing first on the screen. Error routines do not allow you to jump to Column 225 if only 223 columns are in memory. The program does not allow you to jump to a column number greater than 2498.

Tempo

The Tempo entry has a three-digit limit, which enables you to go as high as 999. The music produced is not of great quality, though. The tempo printed on the screen is not necessarily the same tempo as you have entered. This is due to the truncation that occurs when integer values are taken from the number entered. Also, any value less than 28 produces a tempo of 28 and values over 950 produce a value of 950.

Insert and Delete

Press I or D while at the main menu to insert or delete a row of notes at the cursor position. Since inserting a note produces an empty column with no music in it, (a no-no), a whole rest is printed at the middle C position in that column after the insertion is completed. If you are going to enter notes in that column, ignore the rest — it is erased as soon as you press the space bar.

Clear

Press C at the Main menu to clear the music from memory. A buzzer sounds and a warning message is printed in the window. Press ENTER to abort the Clear action or press SHIFT-CLEAR to proceed. The screen is cleared with the HPUT command, which clears one column at a time in a FOR NEXT loop while the memory is cleared with an ML subroutine called by BASIC with a USR instruction. It takes less than one second to complete the entire operation.

Copy

Since C has already been used, *Music3+* uses the letter K for this function. The Copy selection copies any part of the music file to any other part, even in the middle of the file.

```
000 — Load ML program and draw
      screen
002 — Check if ML program
      present, if not poke it in
013 — Arrows and cursor
022 — Score music
046 — Set and retrieve tempo
051 — Play
052 — Play from cursor
053 — Compute move and cursor
      play start
058 — Load a file
059 — Save a file
061 — Delete
063 — Insert
064 — Draw notes from memory
      values
074 — Jump
078 — Move
083 — Copy
089 — Input numbers subroutine
094 — Input filename subroutine
102 — Convert music file
104 — Draw extra music lines; up
      and down arrows
106 — Draw statements and
      screen-prints
114 — Compute memory displayed
      in window
115 — Compute end of song after
      Load
122 — Compute and print cursor
      note number
129 — Erase screen
130 — Erase window
132 — Break trap
133 — Error trap
137 — Dir
147 — Waveform adjust
153 — Data statements
```

Figure 3: The Missing REM Statements

You are prompted for three numbers: the start, end, and destination positions. The destination position must always be higher in memory than the last note to be copied. Also, the ending position must be greater than the starting position. Copy is aborted if the result would create a file that is longer than 2498. Remember, Copy is not an Insert! If you copy columns 1-10 to columns 20-30, the original music that was located in the destination columns are gone. After the process is finished, the last note copied is the first note on your screen. Therefore, if you copy something to the end of the file, only a single note is printed on your screen.

Play and Cursor Play

Press P to play the entire song in memory. Press the ALT key, or @, to play your song starting at the cursor position. This last feature is handy after entering a row of notes.

Waveform

This allows you to change the waveform, or timbre, of the music being played. The new waveform is saved to disk with the music file and stays in effect until you change it back to normal, or turn your computer off and re-run the program. (See THE RAINBOW, June 1986, Page 52.) You are asked for the five percentage values for the fundamental and four harmonics used in the waveform. The sum of these five values must be 100.

A built-in error trap is included. Five input prompts are displayed in the window. The default values for the waveform are 50-25-25-0-0, which is an organ sound. Note that you must enter zeros, even if you enter the number 100 for the fundamental only. Press ENTER to abort the procedure.

Non-Menu Items

Two options are not listed on the main menu mainly because the screen was full. The first is the space bar, which must be pressed to enter music. The second includes the numbers 0-3, which set the drive number and produce a disk directory. (Both of these were mentioned earlier.)

Left and Right Scrolling

When the left arrow is pressed while the cursor is at the far left side of the screen, and not at the start of the file, the notes sort-of scroll to the right. We are working in HSCREEN 4, and anything drawn to the screen must first be erased before something else can be drawn in its place. Therefore, we use the HPUT loop mentioned earlier to clear the screen and re-draw the screen with all notes shifted 12 places to the right. The first four notes on the screen when you pressed the left arrow are now the last four notes on the screen. And since you are scrolling left, the cursor is on the fifth note counting from the right side of the screen. The cursor is on the same note it would have been on after pressing the left arrow if there had been no need to scroll. For example, if the first note on the screen was 34 when you pressed the left arrow the cursor ends up on note 33, but notes 34, 35, 36, and 37 still are on the screen to the right of the cursor.

This was done since the redrawing of the screen takes a few seconds and you would not want to scroll over every single note once the screen is full. Therefore, we scroll 12 notes at a time and leave the extra four notes on the screen to allow you to get your bearings, so to speak. The reverse is true when you press the right arrow on the far right side of the screen.

A Final Note

After this article was written, one slight incompatibility with existing *Music+* files was found. This program assumes that all music is entered with the highest note in Voice 1 (the soprano position) and the lowest note in Voice 4 (bass position). If this was not done when the song was entered using *Music+*, the flags on the notes are not printed correctly to the screen. Before a note is drawn on the screen, this program checks how much higher on the screen the previous note is drawn. If the stems of the notes touch each other, it does not draw any flags on the note below it. This is to make it easier to read the music. It is also done in normal music notation. When, in such a file, the first note being printed is the lowest note in the column, there is no note above it for the computer to check. Consequently, if the program contains a row of 1/64 notes, four flags are drawn on each note, regardless of their position on the screen. It is easy to spot this condition since the program draws the bottom note of a particular row first and then the next one up, and so on. However, this will not affect the playing or editing of that particular song, it only affects the screen drawing.

I sincerely hope that you get as much enjoyment out of this program as I did while writing it. It was quite a challenge. If you have any questions or comments about *Music3+*, feel free to write to me. For a response, please enclose an SASE. ❑

CoCo 3 Disk

2	28	53	20	102	173	142	214
5	230	58	140	105	29	147	61
7	8	62	36	107	51	151	187
11	40	66	65	110	137	156	251
16	69	70	157	116	213	162	191
23	182	78	8	120	91	168	171
30	174	85	44	125	3	173	167
38	130	90	4	132	198	END	142
46	233	96	234	136	154		

You must enter `POKE 25,14:POKE3584,0:NEW` *before loading* `MUSIC3+`.

The Listing: `MUSIC3+`

```
0 'MUSIC3+
** WRITTEN BY GEORGE QUELHORST
** COPYRIGHT (C) APRIL 1991
** BY FALSOFT, INC.
** RAINBOW MAGAZINE
1 CLEAR1380,&H4C8B:RGB:POKE59078
,141:PALETTE0,56:PALETTE1,32:PAL
ETTE2,63:PALETTE3,8:HBUFF1,1367:
HBUFF2,2719:POKE65497,.:POKE4159
8,255:ONBRKGOTO132:Q=2:WIDTH80:C
LS1:POKE65434,56:ATTR0,0:POKE&HF
80F,0:POKE&HF84F,0:POKE&HF89C,0:
POKE140,175
2 ONERRGOTO133:TT=17113:A1=19712
:A2=20099:A3=20100:A4=20257:A5=2
0258:A6=19671:A7=19682:A8=20173:
A9=20128:DEFUSR0=A3:DEFUSR1=A6:D
EFUSR2=19627:DEFUSR3=19596:IFPEE
```


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— DMP 440	18.50		
— DMP 442	5.00	7.50	
— DMP 500	*		
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```
K(20100)=22ANDPEEK(20101)=0ANDPE
EK(20102)=136ANDPEEK(20103)=134
THEN5
3 LOCATE26,12:PRINT"POKING ML PR
OGRAM INTO MEMORY":FORT=1TO41:RE
ADA$:NEXTT:FORD=A1 TO A4:READT$:
POKED,VAL("&H"+T$):NEXT:FORD=A6
TO A7:READP$:POKED,VAL("&H"+P$)
4 NEXT:FORT=19596TO19622:READP$:
POKET,VAL("&H"+P$):NEXTT:FORT=19
627TO19642:READP$:POKET,VAL("&H"
+P$):NEXTT:C=USR1(0)
5 D=PEEK(2394):CLS1:LOCATE33,12:
PRINT"DRAWING SCREEN":POKE59065,
57:HSCREEN4:POKE59065,32:HCLS0:H
COLOR1:HPRINT(12,0),"MUSIC+ FOR
THE COLOR COMPUTER III. BY: GEOR
GE QUELLHORST":EXEC43350:M=A5:ME
=A5:LM=A5:A=3:P1=65496:P2=65497:
GOSUB106
6 H=0:V=52:HCOLOR2:FORT=1TO5:V=V
+8:GOSUB113:NEXTT:V=100:FORT=1TO
5:V=V+8:GOSUB113:NEXTT:HLINE(0,6
0)-(0,140),PSET:HLINE(640,60)-(6
40,140),PSET:HCOLOR3:HDRAW"BM15,
95"+TC$:HDRAW"BM7,138"+BC$:HCOLO
R3:HPRINT(0,20),"Tempo:":HGET(40
,8)-(72,159),1
7 HGET(0,40)-(640,56),2:HLINE(86
,160)-(86,169),PSET:HLINE(239,16
0)-(239,169),PSET:HLINE(376,160)
-(376,169),PSET:HLINE(510,160)-(
510,169),PSET:HPRINT(48,20),"Crs
r Note:":HCOLOR1:HPRINT(59,20),C
N$:HCOLOR3:HPRINT(65,20),"Last N
ote: 0001"
8 GOSUB50:HPRINT(12,20),"Cursor
mem: 20258":HPRINT(31,20),"High
Mem:":HLINE(0,169)-(640,169),PSE
T:HCOLOR1:HPRINT(0,19),P1$:X=55:
PX=90:Y=104:PY=108:HDRAW"BM55,10
4"+D$:GOSUB130:GOSUB110:HCOLOR1:
HPRINT(0,19),"Drv.":HPRINT(3,19)
,STR$(D)
9 POKE59108,230:HSCREEN4:POKE654
34,56:POKE59108,231:IFPEEK(A5)>0
THENGOSUB114:GOSUB64:X=55:Y=104:
GOSUB115
10 P$=INKEY$:IFP$="0"ORP$="1"ORP
$="2"ORP$="3"THEN137ELSE11
11 P=INSTR(1,"gIPCLTSMDK@JW "+CH
R$(4),P$)
12 IFP$=""THEN13ELSEON P GOTO 11
2,61,51,54,58,46,59,78,61,83,52,
74,146,22,102
13 IFPEEK(343)=247THENPX=X:PY=Y:
X=X-35:ME=M:M=M-5:GOSUB118:IFX=2
0THENRB=1 ELSE19
14 IFME=20258ANDRB=1 THENGOSUB10
1:M=A5:X=55:PY=90:RB=0:GOTO10ELS
EIFRB=1 THEN99
15 IFPEEK(344)=247ANDPEEK(M)>0 T
HENPX=X:PY=Y:X=X+35:ME=M:M=M+5:G
OSUB118:IFX=650THENRA=1ELSE19
16 IFRA=1 ANDM<32753 THENGOSUB11
4:RA=0:X=55:GOSUB129:SM=SM+65:EM
=SM+80:X=55:GOSUB64:X=195:GOSUB1
18
17 IFPEEK(341)=247THENGOSUB104:P
X=X:PY=Y:Y=Y-4:IFY=28 THENY=32:P
Y=36ELSE19
18 IFPEEK(342)=247THENGOSUB104:P
X=X:PY=Y:Y=Y+4:IFY=164THENY=160:
PY=156
19 IFHPOINT(X+5,Y-4)=3 THENHCOLO
R2:GOSUB41:HDRAWD$ ELSEHCOLOR1:G
OSUB41:HDRAWD$
20 IFHPOINT(PX+5,PY-4)=3 THENHCO
LOR3:HDRAW"BM"+STR$(PX)+","+STR$
(PY)+D$ ELSEHCOLOR0:HDRAW"BM"+ST
R$(PX)+","+STR$(PY)+D$
21 GOTO10
22 P$=INKEY$
23 IFP$="R"THENQ=1:GOSUB131
24 IFQ=1THENY=104:HCOLOR0:GOSUB4
1:HDRAWR$(7):HCOLOR3:GOSUB41:HDR
AWR$(A)
25 IFP$="N"THENHCOLOR0:HDRAW"BM"
+STR$(X)+",104"+R$(7):Q=2
26 IFP$=CHR$(13)THEN35
27 IFPEEK(343)=247THENA=A+1:IFA=
8THENA=1
28 IFPEEK(344)=247THENA=A-1:IFA=
0THENA=7
29 IFQ=2ANDHPOINT(X-3,101)=3 THE
NHCOLOR0:HDRAW"BM"+STR$(X)+",104
"+R$(7) ELSEIFQ=2THENGOSUB42:HCO
LOR3:GOSUB41:HDRAWN$(A)
30 IFQ=2ANDPEEK(343)=191 THENGOS
UB43:HCOLOR3:GOSUB41:HDRAWF$
31 IFQ=2ANDPEEK(344)=191 THENGOS
UB43:HCOLOR3:GOSUB41:HDRAWS$
32 IFQ=2ANDPEEK(342)=247 THENGOS
UB43
33 IFP$=CHR$(12)ANDQ=2 THENGOSUB
42:GOSUB43:T=Y:GOSUB45:GOTO35
34 GOTO22
35 W=0:FORT=32TO160STEP4:IFHPOIN
T(X-2,T-4)=3 THENW=W+1:N(W)=T
36 IFW=5 THENHCOLOR0:EXEC:GOSUB4
2:GOSUB43:T=Y:GOSUB45:GOTO35
37 NEXTT:TI=INT(128/2^(A-1)+.5):
POKEM,TI:FORS=1TO4:IFN(S)=0THENP
O(S)=0:GOTO39 ELSEP(S)=N(S)/4-8:
PO(S)=VAL(MID$(NO$,P(S)*4+1,3))
38 IFHPOINT(X-5,N(S)-3)=3 THENPO
(S)=PO(S)+2ELSEIFHPOINT(X-6,N(S)
-5)=3 THENPO(S)=PO(S)-2:T=N(S):H
COLOR0:GOSUB44:HDRAWN$(A):GOSUB4
4:HDRAWF$:GOSUB45
39 POKEM+S,PO(S):N(S)=0:NEXTS:SM
=M:EM=M:GOSUB131:X1=X:GOSUB64:X=
X1
40 Q=2:EXEC:GOTO10
41 HDRAW"BM"+STR$(X)+","+STR$(Y)
:RETURN
42 HCOLOR0:GOSUB41:HDRAWN$(7):RE
TURN
43 HCOLOR0:GOSUB41:HDRAWF$:GOSUB
41:HDRAWS$:RETURN
44 HDRAW"BM"+STR$(X)+","+STR$(T)
:RETURN
45 HCOLOR2:IFHPOINT(X-8,T-4)=2 T
HENHLINE(X-3,T-4)-(X+15,T-4),PSE
T:RETURNELSERETURN
46 EXEC:H=7:V=20:HPUT(54,159)-(8
2,167),2,PRESET
47 GOSUB89:H=6:TE=LO:IFTE=0THENT
E=1
48 TE=INT(TT/TE):IFTE<18THENTE=1
8ELSEIFTE>600THENTE=600
49 T1=INT(TE/256):T2=TE-256*T1:P
OKEA8,T1:POKEA8+1,T2:LO$="":HPUT
(54,159)-(82,167),2,PSET:GOSUB50
:GOTO10
50 HCOLOR3:T9=256*PEEK(A8)+PEEK(
A8+1):T9=INT(TT/T9):HPRINT(6,20)
,T9:RETURN
51 POKEA9,0:POKEA9+1,128:C=USR(0
):GOTO10
52 ZT=INT((M-A5)/5)+1:GOSUB53:C=
USR0(0):GOTO10
53 ZT=128+5*(ZT-1):ZU=INT(ZT/409
6):ZV=ZT-4096*ZU:ZW=INT(ZV/256):
ZL=ZV-256*ZW:ZU=16*ZU+ZW:POKEA9,
ZU:POKEA9+1,ZL:RETURN
54 GOSUB101:GOSUB130:GOSUB125
55 P$=INKEY$:IFP$=""THEN55ELSEEX
EC
56 IFP$=CHR$(13)THENGOSUB130:GOS
UB110:GOTO10
57 IFP$="\"THENX=55:GOSUB129:C=U
SR1(0):HCOLOR0:X=55:Y=104:M=A5:L
M=A5:DE=A5:GOSUB130:GOSUB110:GOS
UB118:GOTO10ELSE55
58 IFPEEK(A5)<>0 THENGOSUB101:GO
TO10 ELSEGOSUB130:GOSUB126:H=40:
V=32:GOSUB94:POKEP1,.:LOADMLO$:L
O$="":POKE&HFF40,0:POKEP2,.:GOSU
B130:GOSUB110:HPUT(54,159)-(82,1
67),2,PSET:GOSUB50:GOSUB114:X=55
:GOSUB64:M=A5:GOSUB115:X=55:Y=10
4:GOTO10
59 IFPEEK(A5)=0THENGOSUB101:GOTO
10ELSEGOSUB130:GOSUB126:H=40:V=3
2:LO$="":GOSUB94
60 FORQ1=LM+5 TO LM+10:POKEQ1,0:
NEXTQ1:POKEA9,0:POKEA9+1,128:POK
EP1,.:VERIFYON:SAVEMLO$,A1,Q1,A3
:POKE&HFF40,0:LO$="":GOSUB130:GO
SUB110:POKEP2,.:GOTO10
61 EXEC:X1=X:SM=M:K=M:LC=(INT(X-
55)/35)+2:LC=(17-LC):EM=K+(LC*5)
+9:GOSUB129:IFP=2 THEN63
62 D1=INT((LM+4)/256):D2=(LM+4)-
(D1*256):POKE&H4CBD,D1:POKE&H4CB
E,D2:C=USR2(M):X=X1:EM=EM-4:GOSU
B64:X=X1:Y=104:M=K:LM=LM-5:GOSUB
118:GOTO10
63 HCOLOR1:LM=LM+5:IFLM>32753THE
N10ELSE D1=INT(M/256):D2=M-(D1*2
56):POKE&H4CA8,D1:POKE&H4CA9,D2:
C=USR3(LM):GOSUB64:X=X1:Y=104:M=
K:GOSUB118:GOTO10
64 HCOLOR3:Y1=Y:NS=0:W=0:FORT=SM
 TO EM STEP5:NL=PEEK(T):IFNL=0 T
HENRETURNELSEIFNL=1 THENNL=2:POK
ET,2
65 A=INT(8-(LOG(NL)/LOG(2))):FOR
S=1TO4:NO=PEEK(T+S):IFNO=0THENW=
W+1:GOTO72
66 N$=RIGHT$(STR$(NO),LEN(STR$(N
O))-1):N$=STRING$(3-LEN(N$),"0")
+N$:Y=INSTR(1,NO$,N$):IFY=0 THEN
NO=NO-2:NS=1:GOTO66ELSEY=(((Y-1)
/4)+8)*4:IFY<>0 THENR=R+1:Y(R)=Y
67 HCOLOR2:IFQQ=1 THEN69ELSEIFY>
=32ANDY<=56 THENIFINT(Y/8)=Y/8 T
HENG=Y-4ELSEG=Y
68 IFG>0 THENFORI=G TO 56STEP8:H
LINE(X-6,I)-(X+18,I),PSET:NEXTI:
QQ=1:G=0
69 IFY=152ORY=156 ANDHPOINT(X-2,
148)<>3 THENHLINE(X-6,148)-(X+18
,148),PSET ELSEIFY=160 THENHLINE
(X-6,156)-(X+18,156),PSET:IFHPOI
NT(X-2,148)<>3 THENHLINE(X-6,148
)-(X+18,148),PSET
70 QQ=0:GQ=0:HCOLOR3:IFY(R)-Y(R-
1)<=20 ANDA>3 ANDY(R-1)<Y(R) THE
NGOSUB41:HDRAWN$(3) ELSEGOSUB41:
HDRAWN$(A)
71 IFNS=1THENGOSUB41:HDRAWS$:NS=
0
72 NEXTS:R=0:IFNL<>0 ANDW=4 THEN
HDRAW"BM"+STR$(X)+",104"+R$(A)
73 X=X+35:W=0:NEXTT:Y=Y1:X=X1:RE
TURN
74 GOSUB130:GOSUB124:H=44:V=23
75 GOSUB89:IFLO=<0ORLO>24980RLO>
VAL(LN$)THENGOSUB101:HCOLOR3:HPR
```

```
INT(H,V),LO$:LO$="":GOTO75
76 X=55:GOSUB129:SM=(LO*5)+A5-5:
EM=SM+80:GOSUB64:X=55:ME=M:M=SM
77 GOSUB130:LO$="":GOSUB110:GOSU
B118:GOTO10
78 GOSUB130:GOSUB121:GOSUB128:H=
34:V=23
79 GOSUB89:ZT=LO:IFZT=0 THENZT=1
80 OL$=LO$:LO$="":H=47:GOSUB89:S
E=LO
81 IFZT>SE OR SE>2498THENHCOLOR3
:GOSUB101:HPRINT(34,V),OL$:HPRIN
T(47,V),LO$:LO$="":OL$="":GOTO79
ELSEGOSUB53:SE=(SE*5)+A5:TP=PEEK
(SE):POKESE,0:C=USR(0):POKESE,TP
82 GOSUB130:OL$="":LO$="":GOSUB1
10:GOTO10
83 GOSUB130:GOSUB121
84 GOSUB123:H=24:V=23:GOSUB89:ST
=LO:LO$="":H=37:GOSUB89:EN=LO:LO
$="":H=58:GOSUB89:DE=LO:LO$=""
85 IF EN<ST OR DE<EN THENHCOLOR3
:HPRINT(23,V),ST:HPRINT(36,V),EN
:HPRINT(57,V),DE:GOSUB101:GOTO84
86 ST=A5+(ST*5)-5:EN=A5+(EN*5)-1
:DE=A5+(DE*5)-5:AM=EN-ST:AM=DE+A
M+1:IFAM>32762 ORPEEK(DE-5)=0 TH
ENEN=1:ST=2:GOTO85
87 X=55:Z=0:GOSUB129:FORT=ST TO
EN:L=PEEK(T):POKEDE,L:DE=DE+1:GO
SUB152:NEXT
88 X=55:SM=AM-5:EM=SM+80:GOSUB64
:GOSUB130:GOSUB110:M=AM-5:GOSUB1
18:X=55:GOTO10
89 P$=INKEY$:IFP$=""THEN89 ELSEI
FP$=CHR$(8) ORP$=CHR$(13)THENEXE
C:GOTO90 ELSEIFASC(P$)<48 ORASC(
P$)>57THEN89ELSEEXEC
90 IFLO$=""ANDP$=CHR$(8)THENP$="
":GOTO89 ELSEIFP$=CHR$(8)THENHCO
LOR3:HPRINT(H,V),LO$:HCOLOR2:LO$
=LEFT$(LO$,LEN(LO$)-1):HPRINT(H,
V),LO$:GOTO89
91 IFP$=CHR$(13)ANDLO$=""THENGOS
UB130:GOSUB110:GOTO10
92 IFP$=CHR$(13)THENLO=VAL(LO$):
RETURNELSEIF(P=60RP=13)ANDLEN(LO
$)=>3THEN89ELSEIFLEN(LO$)=>4THEN
89
93 LO$=LO$+P$:HCOLOR2:HPRINT(H,V
),LO$:GOTO89
94 P$=INKEY$:IFP$=""THEN94ELSEEX
EC
95 IFP$=CHR$(8)ANDLO$=""THENP$="
":GOTO94 ELSEIFP$=CHR$(8)THENHCO
LOR3:HPRINT(H,V),LO$:LO$=LEFT$(L
O$,LEN(LO$)-1):HPRINT(H,V),LO$:H
COLOR2:HPRINT(H,V),LO$:GOTO94
96 IFP$=CHR$(13)ANDLO$=""THENGOS
UB130:HCOLOR3:GOSUB110:GOTO10
97 IFP$=CHR$(13)THENRETURN ELSEI
FLEN(LO$)=>8THEN94
98 LO$=LO$+P$:HCOLOR2:HPRINT(H,V
),LO$:GOTO94
99 X=55:X1=475:GOSUB129:SM=SM-65
:IFSM<=A5 THENSM=A5:X1=((M-A5)/5
):X1=(X1*35)+55
100 EM=SM+80:X=55:GOSUB64:X=X1:G
OSUB118:RB=0:GOTO10
101 FORU=1TO20:EXEC:NEXTU:RETURN
102 IFPEEK(19971)=55 THENGOSUB10
1:GOTO10 ELSEGOSUB130:RESTORE:PO
=19967:Z=0:HCOLOR2:HPRINT(30,22)
,"CONVERT MUSIC FILE":HPRINT(18,
23),"PRESS ENTER TO PROCEED / SP
ACEBAR TO ABORT":GOSUB101
103 P$=INKEY$:IFP$=" "THENGOSUB1
30:GOSUB110:GOTO10 ELSEIFP$=CHR$
(13)THENFORT=1TO297:GOSUB152:REA
DA$:NEXT:FORT=1TO132:PO=PO+1:GOS
UB152:READP$:POKEPO,VAL("&H"+P$)
:NEXT:GOSUB130:GOSUB110:GOSUB101
:TE=INT(T9/2):GOTO48 ELSEIFP$=""
THEN103
104 IFY=32 OR Y=40 OR Y=48 ORY=5
6 ORY=152 ORY=160 THENHCOLOR2 EL
SERETURN
105 IFHPOINT(X-2,Y-4)=3 THENHLIN
E(X-7,Y-4)-(X-4,Y-4),PSET:HLINE(
X+15,Y-4)-(X+18,Y-4),PSET:XL=0:R
ETURN ELSEHLINE(X-7,Y-4)-(X+18,Y
-4),PSET:XL=0:RETURN
106 N$(1)="BU2BLR12EU2HL12GD2FBF
BD":N$(2)=N$(1)+"BUBR13U21BD22BL
13":N$(3)=N$(2)+"BUBH2R14UL14UR1
4BD5BL12":N$(4)=N$(3)+"BR13BU22R
4DBD21BL17":N$(5)=N$(4)+"BR13BU1
8R4DBD17BL17":N$(6)=N$(5)+"BR13B
U14R4DBD13BL17":N$(7)=N$(6)+"BR1
3BU10R4DBD9BL17"
107 TC$="HL3GR5DL5FR3EU32E3R4F3D
3G6L9G8D5F5R16E4U4H4L10G3D3RBD5B
L4H5BRU4E7BR9BU2E5U3H2BD18RF3D4G
3":BC$="E18BR4R2EUHL2GR4DL4BDBL3
U6BR3FR2EUHL2GR4DL4BL3H4BDF3D6G4
BU14BRL13G6DFR2EUHFL4DR4BU2BL2E4
":D$="BRBU3R9BU2L9":F$="BL11BUU8
BD3R5DG4LBDBR11"
```


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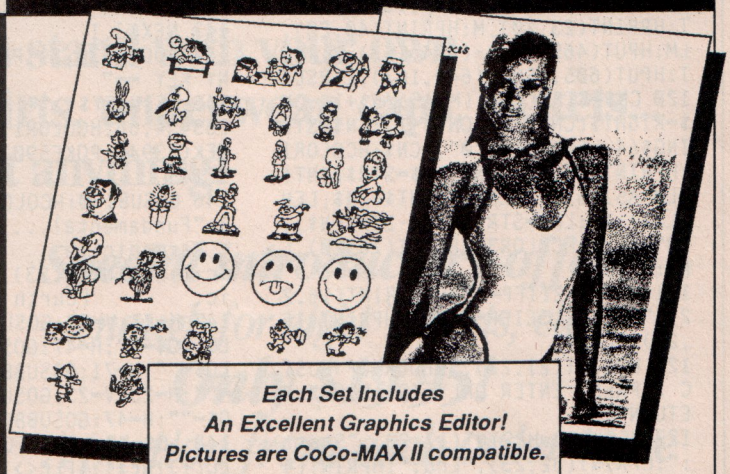

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```
108 S$="BL11BUU6BR4D6BU2BR2L8BU2
R8BD5BR5":R$(1)="BU2L3UR3U3R11D3
R3DL14":R$(2)=R$(1)+"BL3D16":R$(
3)=R$(2)+"BU17R14UL11UR11":R$(4)
=R$(3)+"BL14BD2D17R5":R$(5)=R$(4
)+"BU4L5":R$(6)=R$(5)+"BU4R5":R$
(7)=R$(6)+"BU4L5":CN$="0001":LN$
=CN$
109 NO$="112,108,106,102,098,096
,092,088,084,082,078,074,072,068
,064,060,058,054,050,048,044,040
,036,034,030,026,024,020,016,012
,010,006,002":RETURN
110 HCOLOR2:HPRINT(0,22),"<L>OAD
    <M>OVE    <T>EMPO    <I>NSER
T    <P>LAY    <F1> MENUS    <W
> WAVEFORM":HPRINT(0,23),"<S>AVE
    <J>UMP    <C>LEAR    <D>ELET
E    <K>OPY    <F2> CNVRT    <@
> CRS.PLAY":PQ=1:RETURN
111 HCOLOR2:HPRINT(0,22),"<N> NO
TE     -> RAISE LENGTH     <ENT>
 INSTAL NOTE     <F1>  FLAT
DWN. ARROW":HPRINT(0,23),"<R> RE
ST     <- LOWER LENGTH     <CLR>
 CLEAR  NOTE     <F2> SHARP
CLEAR  F+S":PQ=0:RETURN
112 GOSUB130:IFPQ=1THENGOSUB111:
GOTO10 ELSEGOSUB110:GOTO10
113 HLINE(H,V)-(640,V),PSET:RETU
RN
114 LC=INT((X-55)/35)+1:SM=M-(LC
*5)+5:EM=SM+80:IFX=650THENRETURN
ELSERETURN
115 PE=PEEK(M):IFPE=0THEN117
116 M=M+25:GOSUB152:GOTO115
117 FORT=M TO M-25STEP-5:M=M-5:I
FPEEK(M)=0 THEN117 ELSELM=M:M=A5
:GOSUB118:GOSUB101:RETURN
118 HCOLOR3:IFM<20258 THENM=2025
8 ELSEIFM>LM THENLM=M
119 HPUT(189,159)-(233,167),2,PS
ET:HPUT(325,159)-(369,167),2,PSE
T:HPRINT(23,20),M:HPRINT(40,20),
LM:HPUT(469,159)-(504,167),2,PSE
T:HPUT(605,159)-(640,167),2,PSET
120 CN$=STR$(INT((M-A5)/5)+1):CN
$=RIGHT$(CN$,LEN(CN$)-1):CN$=STR
ING$(4-LEN(CN$),"0")+CN$:HCOLOR1
:HPRINT(59,20),CN$:LN$=STR$(INT(
(LM-A5)/5)+1):LN$=RIGHT$(LN$,LEN
(LN$)-1):LN$=STRING$(4-LEN(LN$),
"0")+LN$:HCOLOR3:HPRINT(76,20),L
N$:RETURN
121 HCOLOR2:IFP=8THENHPRINT(16,2
2),"PLAY"ELSEIFP=10THENHPRINT(16
,22),"COPY"
122 HPRINT(21,22),"BLOCK OF MUSI
C / PRESS ENTER ONLY TO ABORT":R
ETURN
123 HCOLOR2:HPRINT(17,23),"Start
:":HPRINT(32,23),"End:":HPRINT(4
5,23),"Destination:":RETURN
124 HCOLOR2:HPRINT(16,22),"JUMP
TO SPECIFIC COLUMN / PRESS ENTER
 TO ABORT":HPRINT(29,23),"Column
 number:":RETURN
125 HCOLOR2:HPRINT(30,22),"CLEAR
 MUSIC MEMORY":HPRINT(20,23),"SH
IFT-CLEAR TO PROCEED / ENTER TO
ABORT":RETURN
126 HCOLOR2:IFP=5 THENHPRINT(21,
22),"LOAD" ELSEHPRINT(21,22),"SA
VE"
127 HPRINT(26,22),"A PROGRAM / P
RESS ENTER TO ABORT":HPRINT(30,2
3),"FILENAME: ":RETURN
128 HCOLOR2:HPRINT(27,23),"Start
:":HPRINT(42,23),"End:":RETURN
129 FORT=X TO615STEP35:H=T-14:V=
T+18:HPUT(H,8)-(V,159),1,PSET:NE
XTT:RETURN
130 EXEC43350:HPUT(0,175)-(640,1
92),2,PRESET:RETURN
131 HPUT(X-14,8)-(X+18,159),1,PS
ET:RETURN
132 POKE41598,3:CLS1:ATTR0,0:STO
P
133 POKEP2,.:RESTORE:LO$="":GOSU
B101:FORT=0TO ERNO:READER$:NEXT:
POKE59078,51:HSCREEN4:POKE65434,
56:HCOLOR1:HPRINT(3,19),PEEK(239
4)
134 GOSUB130:HCOLOR2:HPRINT(16,2
2),"YOU HAVE ENCOUNTERED A":HPRI
NT(39,22),ER$:HPRINT(42,22),"ERR
OR IN LINE NUMBER":HPRINT(62,22)
,ERLIN:HPRINT(19,23),"PRESS BAR
TO RETRY / ENTER TO BREAK PROGRA
M":POKE59078,141
135 P$=INKEY$:IFP$=""THEN135
136 IFP$=CHR$(32)THENGOSUB130:GO
SUB110:GOTO10 ELSEIFP$=CHR$(13)T
HEN132 ELSE135
137 HCOLOR0:HPRINT(3,19),STR$(D)
:POKE59078,51:HSCREEN0:WIDTH80:D
=VAL(P$):DRIVED:LOCATE20,0:PRINT
"DIRECTORY OF DRIVE";D;"/";FREE(
D);"FREE GRANULES":H=0:V=3
138 FORI=3TO11:DSKI$D,17,I,A1$,A
2$:FORJ=1TO8:IFJ<5 THENK=(J-1)*3
2ELSEK=(J-5)*32
139 IFJ=5THENA1$=A2$
140 A3$=MID$(A1$,K+1,8)+"/"+MID$
(A1$,K+9,3)
141 IFASC(LEFT$(A3$,1))=255THEN1
44ELSEIFASC(LEFT$(A3$,1))=0THEN1
43
142 LOCATEH,V:PRINTA3$;:H=H+17:I
FH>68THENH=0:V=V+1
143 NEXTJ,I
144 LOCATE30,21:PRINT"== PRESS A
NY KEY =="
145 IFINKEY$<>""THENHSCREEN4:POK
E65434,56:HCOLOR1:HPRINT(3,19),P
EEK(2394):POKE59078,141:GOTO10EL
SE145
146 GOSUB130:HCOLOR2:HPRINT(6,22
),"Fundamental....:        First
  Harmonic:        Second Harmon
ic:":HPRINT(6,23),"Third  Harmon
ic:        Fourth Harmonic:"
147 H=23:V=22:GOSUB89:Z=0:LC(0)=
LO:LO$="":H=47:GOSUB89:LC(1)=LO:
LO$="":H=71:GOSUB89:LC(2)=LO:LO$
="":H=23:V=23:GOSUB89:LC(3)=LO:L
O$="":H=47:GOSUB89:LC(4)=LO
148 LO$="":LC=0:FORT=0TO4:LC=LC+
LC(T):NEXT:IFLC<>100 THENGOSUB10
1:GOSUB130:HPRINT(17,23),"SUM OF
 PERCENTAGES MUST BE 100 / PRESS
 ANY KEY" ELSEGOSUB130:GOTO150
149 IFINKEY$<>""THENGOSUB130:GOT
O146ELSE149
150 HPRINT(21,23),"CALCULATING N
EW WAVEFORM - PLEASE WAIT"::FORI
=0TO4:LC(I)=LC(I)/100:NEXT:FORI=
0TO255:AR=2*3.14159*I/256:SC=LC(
0)*SIN(AR)+LC(1)*SIN(2*AR)+LC(2)
*SIN(3*AR)+LC(3)*SIN(4*AR)+LC(4)
*SIN(5*AR):SC=32+INT(31*SC+.5):P
OKEA1+I,SC
151 GOSUB152:NEXT:GOSUB130:GOSUB
101:GOSUB110:GOTO10
152 Z=Z+1:IFINT(Z/25)=Z/25THENEX
EC:RETURNELSERETURN
153 DATA NF,SN,RG,OD,FC,OV,OM,UL
,BS,DD,/0,ID,TM,OS,LS,ST,CN,FD,A
O,DN,IO,FM,NO,IE,DS,UF,NE,BR,DF,
OB,WP,FN,FS,AE,FO,SE,VF,ER,DS,HR
,HP
154 DATA D,E,F,11,12,14,15,16,18
,19,1B,1C,1D,1F,20,22,23,26,27,2
9,2A,2B,2D,2E,30
155 DATA 31,32,34,35,37,38,38,39
,3B,3B,3C,3C,3E,3E,3E,3F,3F,3F,3
F,3F,3F,3F,3E,3E
156 DATA 3E,3C,3C,3B,3B,39,38,37
,37,35,34,32,31,30,2E,2E,2D,2B,2
A,29,27,26,24,23
157 DATA 22,20,1F,1F,1D,1C,1B,1B
,19,19,18,18,16,16,15,15,15,15,1
5,15,15,15,15,15
158 DATA 15,15,15,16,16,16,18,18
,18,19,19,1A,1A,1B,1B,1B,1C,1C,1
E,1F,1F,20,20,22
159 DATA 22,22,22,22,23,23,23,23
,23,23,23,22,22,22,22,20,20,20,1
F,1F,1D,1D,1C,1C
160 DATA 1B,19,19,18,16,15,15,14
,12,12,11,F,E,E,D,B,B,A,8,8,7,7,
6,6,4,4,3,3,3,1
161 DATA 1,1,1,1,1,0,0,0,0,0,1,1
,1,1,1,1,1,3,3,3,3,3,4,4,4,4,4,6
,6,6,6,6,6,6,6,7
162 DATA 7,7,7,7,7,7,6,6,6,6,6,6
,6,6,6,4,4,4,4,4,4,4,4,4,3,3,3
,4,4,4,4,4,4,6,6
163 DATA 6,7,7,7,8,A,A,B,D,0,0,1
,37,1,4A,1,5E,1,72,1,88,1,A0,1,B
9,1,D3,1,EE,2,0C
164 DATA 2,2B,2,4C,2,6F,2,94,2,B
B,2,E4,3,10,3,3F,3,71,3,A5,3,DC,
4,17,4,56,4,98,4
165 DATA DD,5,28,5,76,5,C9,6,21,
6,7F,6,E2,7,4A,7,B9,8,2F,8,AC,9,
30,9,BB,A,50,A
166 DATA ED,B,93,C,43,C,FE,D,C4,
E,95,F,73,10,5F,11,58,12,60,13,7
7,14,A0,15,DA,17
167 DATA 26,18,87,19,FC,1B,88,1D
,2B,1E,E7,20,BE,22,B0,24,C0,26,E
F,29,40,2B,B4,2E
168 DATA 4D,31,0E,16,0,88,86,4C,
1F,8B,86,3F,B7,FF,23,1A,50,30,8D
,FE,6A,9F,C3,9F
169 DATA C6,9F,C9,9F,CC,30,8D,0,
80,9F,C0,39,9E,C0,A6,80,97,C2,39
,31,8D,FF,50,A6
170 DATA 80,EE,A6,DF,CF,A6,80,EE
,A6,DF,D1,A6,80,EE,A6,DF,D3,A6,8
0,EE,A6,DF,D5,9F
171 DATA C0,39,10,8E,0,BE,A6,9F,
4C,C3,AB,9F,4C,C6,A9,9F,4C,C9,A9
,9F,4C,CC,B7,FF
172 DATA 20,DC,C4,D3,CF,DD,C4,DC
,C7,D3,D1,DD,C7,DC,CA,D3,D3,DD,C
A,DC,CD,D3,D5,DD
173 DATA CD,31,A2,26,6,A,C2,27,C
,20,C7,A6,80,20,0,20,0,20,0,20,C
1,39,17,FF,75,8D
174 DATA 91,81,0,26,4,4F,1F,8B,3
9,8D,8E,8D,AB,20,F0,8E,4F,22,4F,
A7,80,8C,7F,F1
175 DATA 26,F9,39,BD,B3,ED,1F,02
,A6,A2,A7,25,10,BC,4C,A8,26,F6,C
E,00,00,86,80
176 DATA A7,A0,EF,A1,EF,A4,39,BD
,B3,ED,1F,02,A6,25,A7,A0,10,BC,4
C,BD,26,F6,39
```

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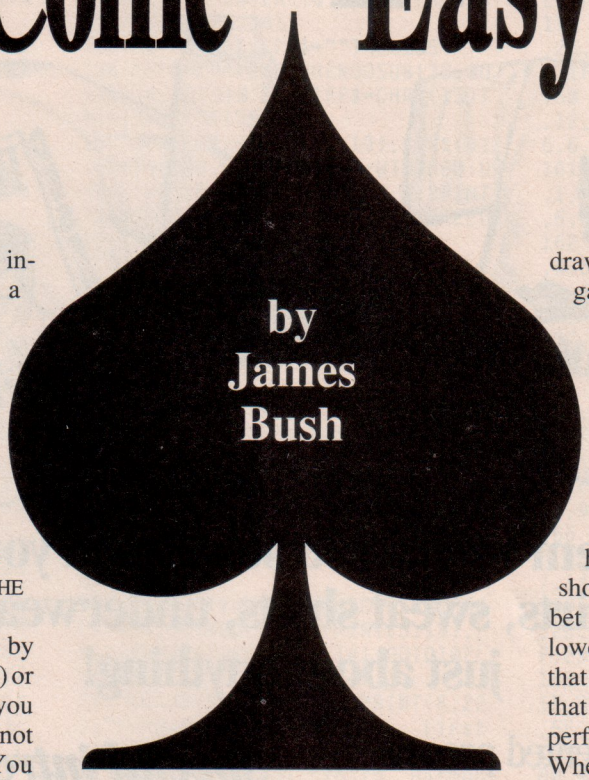
Easy Come, Easy Go!



by James Bush

Easy Come, Easy Go was inspired by *Card Guppies*, a game I found on a local BBS. Everyone who called loved the game, but it was run on a Tandy 1000. I thought the CoCo Community would enjoy this kind of game. It works similar to the bonus round on the game show *Card Sharks*. While writing *Easy Come, Easy Go*, I got a lot of ideas from a *Solitaire* game that appeared in THE RAINBOW.

After you enter the listing, save it by entering `SAVE"EASYGO.BAS:0"` (for disk) or `CSAVE"EASYGO.BAS"` (for tape). When you run the game, you are asked whether or not you want it to use the high-speed poke. You are also asked whether or not you want to see the instructions. After you make these choices, a message appears at the top of the screen telling you the cards are being selected. This takes more time than anything else in this program, but be patient. After this, just press ENTER to start the game.

Rules of Play

Easy Come, Easy Go is easy to play (no pun intended). You see 12 playing cards drawn on the screen along with three "change" cards. The 12 playing cards are arranged into three rows with six cards on the bottom row, four cards in the middle, and two cards on top. A change card appears to the left of each row. The change card can replace your current card on the playing board, should you choose to do so. Under the playing board you see the options: C for Change Card and P for Place Bet. Printed under these options is the amount of money you have in your account. You always start with $20, and your objective is to break the bank. I set the bank limit at $50,000,000 because of BASIC. Fifty million is eight digits long. If you work with numbers larger than that on the CoCo, you end up with lots of scientific notation. Because of the string manipulations and drawing used, scientific notation is out. The game won't stop until you go over $50,000,000 so, if you get up to $49,999,999 and double it on a bet, you can score as much as $99,999,998 when you break the bank.

When you first start the game, all the cards are face down, except the first card on the bottom row. You bet on whether you think the next card is higher or lower than the card being shown. For example, if a 7 is showing, you bet on whether the next card is higher or lower. In this case, the odds are 50 percent that the next card is higher and 50 percent that the next card is lower. This would be a perfect time for the Change Card option. When you press C, the card to the left of the row you're working on is turned face up, and it replaces the current card. Following our example, the 7 would be changed to another card, say a 2. Use this change option wisely and sparingly — you have only one Change Card per row.

Since a 2 is showing, you would bet everything that the next card is higher since nothing is lower than 2. (The same goes for the Ace — nothing is higher than the Ace.) Press P to Place your bet, and type in the amount of the bet. At this point, an up arrow and a down arrow are drawn on the screen. If your guess is that the next card is higher, press the up-arrow key. Otherwise press the down-arrow key. Win or lose, the amount of the bet is added or subtracted from your account accordingly.

If you enter the wrong amount for a bet, press the left arrow and the screen will be

---

James Bush, an electronics technician, has had a CoCo system for about five years and is president of his local Color Computer Club. His non-computer hobbies include working on high-performance cars. He can be contacted at 1545 Ferris Rd., Apt. C-3, Columbus, OH 43224.

redrawn. Then you can re-enter your bet. If you bet more than you have in your account (this is known as cheating), the bet is not acknowledged by the computer. One last thing about placing bets: If you are on the top row with only two cards, the first is turned up and the second is turned down, it is the final bet of the game. Since it is sort of like the grand finale, you must bet at least half of your account or the CoCo won't acknowledge your bet.

If you bet everything and lose, you are bankrupt and the game is over. You have the option of quitting or starting a new game.

If you draw a Joker, you are forced into bankruptcy and have the same options of starting a new game or quitting. If you break the bank you are rewarded with a nice song and celebration.

About the Program

Writing *Easy Come, Easy Go* was just like making the rules for a card game. (There are so many IF/THEN statements, I don't care if I ever see one again!) The first thing the program does is select the cards. This is done by arranging an array with 53 elements (52 cards, plus a Joker). As a novice programmer, I made what I think is an astonishing discovery. I originally used the RND statement to select the cards from the array. This worked fine until I loaded the program a few times and discovered that I was coming up with the same cards in every game. I later found that this is because of the CoCo's internal timer. I put in a lot of commands to throw the timer out of whack and finally succeeded in getting a good approximation of random choices.

After the computer selects a given card for a game, the card is marked so it cannot be chosen again. The computer then checks to see what card you are on and is ready to draw the screen using many DRAW statements. The options are drawn using variables defined near the beginning of the program. You can place a bet or change the card. The cards are compared to see if you guessed right. Program operation is broken down into simple sections and highlighted with REM lines in the listing.

Ending the Game

When you want to quit, do so at one of the menus showing the Quit option. The game operates in the high-speed mode on the CoCo 1 and 2, and normal operation is resumed when you select Quit. CoCo 3 users should change POKE 65495,0 to POKE 65497,0 in Line 20 and POKE 65494,0 to POKE 65496,0 in lines 25 and 1025. You can exit the game by pressing BREAK at any time, but remember to enter POKE 65494,0 (or POKE 65496,0) before doing any disk or tape I/O.

If you want to play a more challenging game, delete Line 830 and you'll run into the Joker more often. If you want your game to be easier, change the RND(3)s in Line 920 to something like RND(20) and you might never draw a Joker.

❑

32K Extended

```
25 ..... 169    36Ø ..... 176    77Ø ..... 143    1185 ..... 191
85 ..... 162    425 ..... 93     835 ..... 2Ø1    1215 ..... 81
125 ..... 15    46Ø ..... 154    875 ..... 223    1245 ..... 1Ø8
15Ø ..... 67    51Ø ..... 159    93Ø ..... 73     1275 ..... 63
165 ..... 119   555 ..... 132    975 ..... 45     13Ø5 ..... 195
185 ..... 39    59Ø ..... 2Ø5    1Ø15 ..... 51    1335 ..... 81
215 ..... 183   62Ø ..... 176    1Ø55 ..... 81    1365 ..... 11Ø
245 ..... 247   64Ø ..... 23Ø    1Ø85 ..... 246   1395 ..... 127
275 ..... 176   685 ..... 67     1135 ..... 47    END ..... 174
31Ø ..... 121   725 ..... 48     117Ø ..... 182
```

The Listing: EASYGO

```
1 'EASY COME EASY GO
2 'WRITTEN BY JAMES BUSH
3 'COPYRIGHT (C) APRIL 1991
4 'BY FALSOFT, INC.
5 'RAINBOW MAGAZINE
10 CLS:PRINT"      easy come / e
asy go":PRINT:PRINT:PRINT"A GAME
 OF WINNING AND LOSING.   (WHAT
ELSE DO YOU DO IN GAMES?)":PRINT
:PRINT:PRINT"HIGH SPEED POKE (Y/
N)?"
15 G$=INKEY$
20 IFG$="Y" THEN POKE65495,0:GOT
O 35
25 IFG$="N" THEN POKE65494,0:GOT
O35
30 GOTO 15
35 PRINT@480,"DO YOU WANT INSTRU
CTIONS (Y/N)?";
40 G$=INKEY$
45 IFG$="Y" THEN 1180
50 IFG$="N" THEN 60
55 GOTO 40
60 CLS:CLEAR2000:M=20:JJ=100
65 DIMN$(15),T$(2),L$(28),F$(8),
A$(15),B$(15),A(15),D(53),E(8),H
$(8)
70 GOSUB150
75 FORI=1TO15:A(I)=0:NEXTI:S=0
80 GOSUB 785
85 PRINT@480,"PRESS <ENTER> TO S
TART GAME";
90 G$=INKEY$
95 IFG$=CHR$(13) THEN 105
100 GOTO 90
105 GOSUB935
110 GOTO200
115 DRAW"BM24,136;XL$(27);":DRAW
"BM27,136;XL$(3);":DRAW"BM34,136
;XL$(28);":DRAW"BM42,136;XL$(8);
":DRAW"BM49,136;XL$(1);":DRAW"BM
56,136;XL$(14);":DRAW"BM63,136;X
L$(7);":DRAW"BM70,136;XL$(5);"
120 DRAW"BM84,136;XL$(3);":DRAW"
BM91,136;XL$(1);":DRAW"BM98,136;
XL$(18);":DRAW"BM105,136;XL$(4);
"
125 DRAW"BM24,148;XL$(27);":DRAW
"BM27,148;XL$(16);":DRAW"BM34,14
8;XL$(28);":DRAW"BM42,148;XL$(12
);":DRAW"BM49,148;XL$(1);":DRAW"
BM56,148;XL$(3);":DRAW"BM63,148;
XL$(5);"
130 DRAW"BM77,148;XL$(2);":DRAW"
BM84,148;XL$(5);":DRAW"BM93,148;
XL$(20);"
135 DRAW"BM27,188;XL$(5);":DRAW"
BM34,188;XL$(1);":DRAW"BM41,188;
XL$(19);":DRAW"BM49,188;XL$(25);
":DRAW"BM63,188;XL$(3);":DRAW"BM
70,188;XL$(15);":DRAW"BM77,188;X
L$(13);":DRAW"BM84,188;XL$(5);"
140 DRAW"BM98,188;XL$(5);":DRAW"
BM105,188;XL$(1);":DRAW"BM112,18
8;XL$(19);":DRAW"BM120,188;XL$(2
5);":DRAW"BM134,188;XL$(7);":DRA
W"BM141,188;XL$(15);"
145 GOTO305
150 N$(0)="BUU4ER2FD4GL2H":N$(1)
="U4E2F2D2L3R3D2":N$(2)="BU5ER2F
DGL2GD2R4":N$(3)="BR3L2HBU4ER2FD
GLRFDG":N$(4)="BR3U6G3DR4":N$(5)
```

```
="BR3L2HBU5R4L4D2R3FD2G":N$(6)="
BR3L2HU4ER2FBD2BL3R2FDG"
155 N$(7)="BU6R4DG3D2":N$(8)="BR
3L2HUEHUER2FDGL2R2FDG":N$(9)="BU
FR2EU2L3HUER2FD4":N$(10)="R2LU5L
RUBR5R2FD4GL2HU4E":N$(11)="UDR3U
6L2R4":N$(12)="BR1HU4ER2FD4GLBUF
2":N$(13)="U6BR4G3F3":N$(14)="R2
LU6DLRBRBD5"
160 N$(15)="U2E1U2E1F1D2F1D2L4R5
E5R1F2L1H1D1G1D1G1L8D3F1D2F1R2E1
U2E1U3"
165 T$(1)="R20F2D30R1U30D30G2E2L
1G2L20D1R20U1L20H2U30E2"
170 T$(2)="R20F2D30R1U30D30G2E2L
1G2L20D1R20U1L21H2U30E2D34R2U34R
2D34R2U34R2D34R2U34R2D34R2U34R2D
34R2U34R2D34E2U30"
175 L$(1)="U4E2F2D2L3R3D2":L$(2)
="U6R3F1D1G1L3R3F1D1G1L3":L$(3)=
"R3E1G1L3U6R3F1":L$(4)="R2E2G2L2
U6R2F2D2":L$(5)="R4L4U3R3L3U3R4"
:L$(6)="U3R3L3U3R4":L$(7)="R3E1U
1L1R1D1G1L3U6R3F1":L$(8)="U6D3R4
U3D6":L$(9)="R4L2U6R2L4":L$(10)=
"U1D1R3U6R2L5"
180 L$(11)="U6D3E3G3F3":L$(12)="
R4L4U6":L$(13)="U6F2E2D6":L$(14)
="U6D1F4D1U6":L$(15)="U6R4D6L4":
L$(16)="U6R3F1D1G1L3":L$(17)="R2
E1H1F2H1U4H1L2G1D4F1":L$(18)="U6
R3F1D1G1L3F3":L$(19)="R3E1U1H1L2
H1U1E1R2"
185 L$(20)="U6R2L4":L$(21)="U6D6
R4U6":L$(22)="H2U4D4F2E2U4":L$(2
3)="U6D6E2F2U6":L$(24)="U1E2F2D1
U1H4U1D1F2E2U1":L$(25)="U3E2U1D1
G2H2U1":L$(26)="R4L4U1E4U1L4":L$
(27)="H3E3":L$(28)="E3H3"
190 AA$="T403L8DP32DP32DL4.GL4.B
L8DP32DP32DL4.GL2.BP32":AB$="L4G
P32L8GF#P32F#P32EP32EL2.DP32":AC
$="L8DP32DP32DL4.F#L4AP32L8DP32D
P32DL4.F#L2.AP32":AD$="O4L4DL8EP
32DP32CP32O3BAL2G"
195 RETURN
200 PMODE4,1:COLOR0,1:PCLS(1):SC
REEN1,1
205 IF A(13)=0 THEN DRAW"BM4,0;X
T$(2);" ELSE DRAW"BM2,0;XT$(1);"
:DRAW"BM7,20;XA$(13);"
210 IF A(11)=0 THEN DRAW"BM126,0
;XT$(2);" ELSE DRAW"BM125,0;XT$(
1);":DRAW"BM130,20;XA$(11);"
215 IF A(12)=0 THEN DRAW"BM162,0
;XT$(2);" ELSE DRAW"BM160,0;XT$(
1);":DRAW"BM165,20;XA$(12);"
220 IF A(14)=0 THEN DRAW"BM4,44;
XT$(2);" ELSE DRAW"BM2,44;XT$(1)
;":DRAW"BM7,64;XA$(14);"
225 IF A(7)=0 THEN DRAW"BM90,44;
XT$(2);" ELSE DRAW"BM90,44;XT$(1
);":DRAW"BM95,64;XA$(7);"
230 IF A(8)=0 THEN DRAW"BM126,44
;XT$(2);" ELSE DRAW"BM125,44;XT$
(1);":DRAW"BM130,64;XA$(8);"
235 IF A(9)=0 THEN DRAW"BM162,44
;XT$(2);" ELSE DRAW"BM160,44;XT$
(1);":DRAW"BM165,64;XA$(9);"
240 IF A(10)=0 THEN DRAW"BM196,4
4;XT$(2);" ELSE DRAW"BM195,44;XT
$(1);":DRAW"BM200,64;XA$(10);"
245 IF A(15)=0 THEN DRAW"BM4,88;
XT$(2);" ELSE DRAW"BM2,88;XT$(1)
;":DRAW"BM7,108;XA$(15);"
250 IF A(1)=0 THEN DRAW"BM55,88;
XT$(2);" ELSE DRAW"BM55,88;XT$(1
);":DRAW"BM60,108;XA$(1);"
255 IF A(2)=0 THEN DRAW"BM90,88;
XT$(2);" ELSE DRAW"BM90,88;XT$(1
);":DRAW"BM95,108;XA$(2);"
260 IF A(3)=0 THEN DRAW"BM126,88
;XT$(2);" ELSE DRAW"BM125,88;XT$
(1);":DRAW"BM130,108;XA$(3);"
265 IF A(4)=0 THEN DRAW"BM162,88
;XT$(2);" ELSE DRAW"BM160,88;XT$
(1);":DRAW"BM165,108;XA$(4);"
270 IF A(5)=0 THEN DRAW"BM196,88
;XT$(2);" ELSE DRAW"BM195,88;XT$
(1);":DRAW"BM200,108;XA$(5);"
275 IF A(6)=0 THEN DRAW"BM230,88
;XT$(2);" ELSE DRAW"BM230,88;XT$
(1);":DRAW"BM235,108;XA$(6);"
280 IFA$(N-1)=N$(15) THEN FORX=1
TO1000:NEXTX:JJ=0:GOTO1065
285 IFA(12)<>0 THEN FORX=1TO1000
:NEXTX:GOTO1145
290 IFM<1 THEN FORX=1TO1000:NEXT
X:GOTO1065
295 IFM>50000000 THEN FORX=1TO10
00:NEXTX:GOTO995
300 GOTO115
305 REM CHECK ACCOUNT
310 DRAW"BM27,160;XL$(1);":DRAW"
BM34,160;XL$(3);":DRAW"BM41,160;
XL$(3);":DRAW"BM48,160;XL$(15);"
:DRAW"BM55,160;XL$(21);":DRAW"BM
62,160;XL$(14);":DRAW"BM71,160;X
L$(20);":DRAW"BM78,156;R4;":DRAW
"BM78,158;R4;":DRAW"BM87,160;XL$
(19);":DRAW"BM89,161;U8;"
315 DRAW"BM87,160;"
320 U=INT(M)
325 FORV=1TO8
330 U=U*.1
335 IF U < 1 THEN 345
340 NEXTV
345 FORW=1TO(8-V):F$(W)=N$(0):NE
XTW
350 IFV=3 THEN VV=6 ELSE IF V=4
THEN VV=5 ELSE IF V=5 THEN VV=4
ELSE IF V=6 THEN VV=3 ELSE IF V=
7 THEN VV=2 ELSE IF V=8 THEN VV=
1 ELSE IF V=2 THEN VV=7 ELSE IF
V=1 THEN VV=8
355 FOR W = VV TO 8 STEP1:U=U*10
360 Z=FIX(U)
365 IFZ=0 THEN F$(W)=N$(0)
370 IFZ=1 THEN F$(W)=N$(14)
375 IFZ=2 THEN F$(W)=N$(2)
380 IFZ=3 THEN F$(W)=N$(3)
385 IFZ=4 THEN F$(W)=N$(4)
390 IFZ=5 THEN F$(W)=N$(5)
395 IFZ=6 THEN F$(W)=N$(6)
400 IFZ=7 THEN F$(W)=N$(7)
405 IFZ=8 THEN F$(W)=N$(8)
410 IFZ=9 THEN F$(W)=N$(9)
415 U=U-Z
420 NEXTW
425 DRAW"BM95,160;XF$(1);":DRAW"
BM103,160;XF$(2);":DRAW"BM111,16
0;XF$(3);":DRAW"BM119,160;XF$(4)
;":DRAW"BM127,160;XF$(5);":DRAW"
BM135,160;XF$(6);":DRAW"BM143,16
0;XF$(7);":DRAW"BM151,160;XF$(8)
;"
430 'REM WAIT FOR INPUT
435 H$=INKEY$
440 IFH$="C" OR H$="c" THEN SOUN
D200,1:GOTO1035
445 IFH$="P" OR H$="p" THEN SOUN
D200,1:GOTO455
450 GOTO435
455 DRAW"BM27,172;XL$(8);":DRAW"
BM34,172;XL$(15);":DRAW"BM41,172
;XL$(23);":DRAW"BM55,172;XL$(13)
;":DRAW"BM62,172;XL$(21);":DRAW"
BM69,172;XL$(3);":DRAW"BM76,172;
XL$(8);":DRAW"BM87,172;XL$(19);"
:DRAW"BM89,173;U8;"
460 FORX=1 TO 8:H$(X)=N$(0):E(X)
=0:NEXTX
465 P=0
470 FORJ=1TO8
475 G$=INKEY$
480 IFG$="0" THEN E(J)=0:H$(J)=N
$(0):SOUND150,1:GOTO740
485 IFG$="1" THEN E(J)=1:H$(J)=N
$(14):SOUND150,1:GOTO740
490 IFG$="2" THEN E(J)=2:H$(J)=N
$(2):SOUND150,1:GOTO740
495 IFG$="3" THEN E(J)=3:H$(J)=N
$(3):SOUND150,1:GOTO740
500 IFG$="4" THEN E(J)=4:H$(J)=N
$(4):SOUND150,1:GOTO740
505 IFG$="5" THEN E(J)=5:H$(J)=N
$(5):SOUND150,1:GOTO740
510 IFG$="6" THEN E(J)=6:H$(J)=N
$(6):SOUND150,1:GOTO740
515 IFG$="7" THEN E(J)=7:H$(J)=N
$(7):SOUND150,1:GOTO740
520 IFG$="8" THEN E(J)=8:H$(J)=N
$(8):SOUND150,1:GOTO740
525 IFG$="9" THEN E(J)=9:H$(J)=N
$(9):SOUND150,1:GOTO740
530 IFG$=CHR$(13) THEN 555
535 IFG$=CHR$(8) AND J-1=0 THEN
SOUND 75,1:GOTO475
540 IFG$=CHR$(8) AND J-1>0 THEN
SOUND75,1:GOTO105
545 GOTO 475
550 NEXTJ
555 SOUND50,1:P=(E(1)*(10^7))+(E
(2)*(10^6))+(E(3)*(10^5))+(E(4)*
(10^4))+(E(5)*(10^3))+(E(6)*(10^
2))+(E(7)*(10^1))+(E(8)*(10^0))
560 IFJ-1=0 THEN 470
565 IFJ-1=1 THEN P=P*.0000001 EL
SE IFJ-1=2 THEN P=P*.000001 ELSE
 IF J-1=3 THEN P=P*.00001 ELSE I
F J-1=4 THEN P=P*.0001 ELSE IF J
-1=5 THEN P=P*.001 ELSE IF J-1=6
 THEN P=P*.01 ELSE IF J-1=7 THEN
 P=P*.1 ELSE IF J-1=8 THEN P=P
570 P=P+.1:P=INT(P)
575 IF P>M THEN 105
580 IFB$(11)<>T$(2) AND A(11)<>0
 AND P<(M/2) THEN 105
585 'REM GUESS HIGH OR LOW
590 DRAW"BM170,160;U7G3E3F3;":DR
AW"BM170,165;D7H3F3E3;":DRAW"BM1
71,161;U7G3E3F3;":DRAW"BM171,166
;D7H3F3E3;"
595 G$=INKEY$
600 IFG$=CHR$(94) THEN L=1:SOUND
175,1:DRAW"BM179,160;XL$(8);":DR
AW"BM186,160;XL$(9);":DRAW"BM193
,160;XL$(7);":DRAW"BM200,160;XL$
(8);":DRAW"BM207,160;XL$(5);":DR
AW"BM214,160;XL$(18);":GOTO615
605 IFG$=CHR$(10) THEN L=0:SOUND
175,1:DRAW"BM179,172;XL$(12);":D
RAW"BM186,172;XL$(15);":DRAW"BM1
93,172;XL$(23);":DRAW"BM200,172;
XL$(5);":DRAW"BM207,172;XL$(18);
":GOTO615
610 GOTO 595
615 'REM FIND VALUE OF CARDS
620 FORX=1TO500:NEXTX
625 IFA$(N)=N$(1) THEN JJ=14 ELS
E IF A$(N)=N$(13) THEN JJ=13 ELS
```

```
E IF A$(N)=N$(12) THEN JJ=12 ELS
E IF A$(N)=N$(11) THEN JJ=11 ELS
E IF A$(N)=N$(10) THEN JJ=10 ELS
E IF A$(N)=N$(9) THEN JJ=9 ELSE
IF A$(N)=N$(8) THEN JJ=8 ELSE IF
 A$(N)=N$(7) THEN JJ=7
630 IFA$(N)=N$(6) THEN JJ=6 ELSE
 IF A$(N)=N$(5) THEN JJ=5 ELSE I
F A$(N)=N$(4) THEN JJ=4 ELSE IF
A$(N)=N$(3) THEN JJ=3 ELSE IF A$
(N)=N$(2) THEN JJ=2
635 IFA$(N)=N$(15) THEN JJ=0
640 IFA$(N-1)=N$(1) THEN KK=14 E
LSE IFA$(N-1)=N$(13) THEN KK=13
ELSE IFA$(N-1)=N$(12) THEN KK=12
 ELSE IFA$(N-1)=N$(11) THEN KK=1
1 ELSE IFA$(N-1)=N$(10) THEN KK=
10 ELSE IFA$(N-1)=N$(9) THEN KK=
9 ELSE IF A$(N-1)=N$(8) THEN KK=
8
645 IFA$(N-1)=N$(7) THEN KK=7 EL
SE IFA$(N-1)=N$(6) THEN KK=6 ELS
E IF A$(N-1)=N$(5) THEN KK=5 ELS
E IF A$(N-1)=N$(4) THEN KK=4 ELS
E IF A$(N-1)=N$(3) THEN KK=3 ELS
E IF A$(N-1)=N$(2) THEN KK=2
650 'REM DETERMINE HIGHER OR LOW
ER
655 IFL=1 AND JJ>KK THEN 685
660 IFL=0 AND JJ<KK THEN 685
665 IFL=1 AND JJ<KK THEN 700
670 IFL=0 AND JJ>KK THEN 700
675 IF JJ=0 THEN 700
680 IFJJ=KK THEN 720
685 DRAW"BM179,188;XL$(23);":DRA
W"BM186,188;XL$(9);":DRAW"BM193,
188;XL$(14);":DRAW"BM200,188;XL$
(14);":DRAW"BM207,188;XL$(5);":D
RAW"BM214,188;XL$(18);"
690 SOUND225,2:M=M+P:A(N)=1:FORX
=1TO750:NEXTX
695 GOTO105
700 DRAW"BM179,188;XL$(12);":DRA
W"BM186,188;XL$(15);":DRAW"BM193
,188;XL$(19);":DRAW"BM200,188;XL
$(5);":DRAW"BM207,188;XL$(18);"
705 SOUND225,2:M=M-P:A(N)=1:FORX
=1TO750:NEXTX
710 IFJJ=0 THEN M=0
715 GOTO105
720 DRAW"BM179,188;XL$(5);":DRAW
"BM186,188;XL$(17);":DRAW"BM193,
188;XL$(21);":DRAW"BM200,188;XL$
(1);":DRAW"BM207,188;XL$(12);"
725 SOUND225,1:FORX=1TO75:NEXTX:
SOUND225,1:A(N)=1
730 FORX=1TO750:NEXTX
735 GOTO105
740 IFJ=1 THEN DRAW"BM95,172;XH$
(1);"
745 IFJ=2 THEN DRAW"BM103,172;XH
$(2);"
750 IFJ=3 THEN DRAW"BM111,172;XH
$(3);"
755 IFJ=4 THEN DRAW"BM119,172;XH
$(4);"
760 IFJ=5 THEN DRAW"BM127,172;XH
$(5);"
765 IFJ=6 THEN DRAW"BM135,172;XH
$(6);"
770 IFJ=7 THEN DRAW"BM143,172;XH
$(7);"
775 IFJ=8 THEN DRAW"BM151,172;XH
$(8);"
780 GOTO 550
785 'REM SELECT CARDS
790 CLS:PRINT@0,"********SELECTI
NG CARDS*********";
795 FORX=1TO53:D(X)=X:NEXTX
800 FORI=1TO15
805 F=RND(100):FORX=1TOF:NEXTX:G
=RND(-TIMER):H=(G*100)
810 X=INT(H)
815 IFX>53 THEN 805
820 IFD(X)=0 THEN 805
825 IFX<1 THEN 805
830 IFX=53 THEN 920
835 IFX=53 THEN A$(I)=N$(15)
840 IFX=2 OR X=15 OR X=28 OR X=4
1 THEN A$(I)=N$(3)
845 IFX=3 OR X=16 OR X=29 OR X=4
2 THEN A$(I)=N$(4)
850 IFX=4 OR X=17 OR X=30 OR X=4
3 THEN A$(I)=N$(5)
855 IFX=5 OR X=18 OR X=31 OR X=4
4 THEN A$(I)=N$(6)
860 IFX=6 OR X=19 OR X=32 OR X=4
5 THEN A$(I)=N$(7)
865 IFX=7 OR X=20 OR X=33 OR X=4
6 THEN A$(I)=N$(8)
870 IFX=8 OR X=21 OR X=34 OR X=4
7 THEN A$(I)=N$(9)
875 IFX=9 OR X=22 OR X=35 OR X=4
8 THEN A$(I)=N$(10)
880 IFX=10 OR X=23 OR X=36 OR X=
49 THEN A$(I)=N$(11)
885 IFX=11 OR X=24 OR X=37 OR X=
50 THEN A$(I)=N$(12)
890 IFX=12 OR X=25 OR X=38 OR X=
51 THEN A$(I)=N$(13)
895 IFX=13 OR X=26 OR X=39 OR X=
52 THEN A$(I)=N$(1)
900 IFX=14 OR X=27 OR X=40 OR X=
1 THEN A$(I)=N$(2)
905 D(X)=0
910 NEXTI
915 RETURN
920 J=RND(3):K=RND(3)
925 IFJ=K THEN 835
930 GOTO 810
935 'REM CHECK FOR CURRENT CARD
940 IFS=0 THEN A(1)=1:S=1
945 IFA(1)<>0 AND A(2)=0 THEN N=
2
950 IFA(2)<>0 AND A(3)=0 THEN N=
3
955 IFA(3)<>0 AND A(4)=0 THEN N=
4
960 IFA(4)<>0 AND A(5)=0 THEN N=
5
965 IFA(5)<>0 AND A(6)=0 THEN N=
6
970 IFA(6)<>0 AND A(7)=0 THEN A$
(7)=A$(6):N=8:A(7)=1
975 IFA(8)<>0 AND A(9)=0 THEN N=
9
980 IFA(9)<>0 AND A(10)=0 THEN N
=10
985 IFA(10)<>0 AND A(11)=0 THEN
A$(11)=A$(10):N=12:A(11)=1
990 RETURN
995 CLS:PRINT@0,"********CONGRAT
ULATIONS!********";
1000 PRINT@64,"YOU HAVE BROKEN T
HE BANK WHICH  IS CURRENTLY SET
AT $50,000,000 DOLLARS. DON'T YO
U WISH IT WAS  REAL MONEY!"
1005 PLAYAA$+AB$:PLAYAC$+AD$
1010 PRINT@256,"END OF GAME OPTI
ONS:              <1> START NEW GA
ME                <2> QUIT";
1015 G$=INKEY$
1020 IFG$="1" THEN RUN
1025 IFG$="2" THEN CLS:PRINT"THA
```

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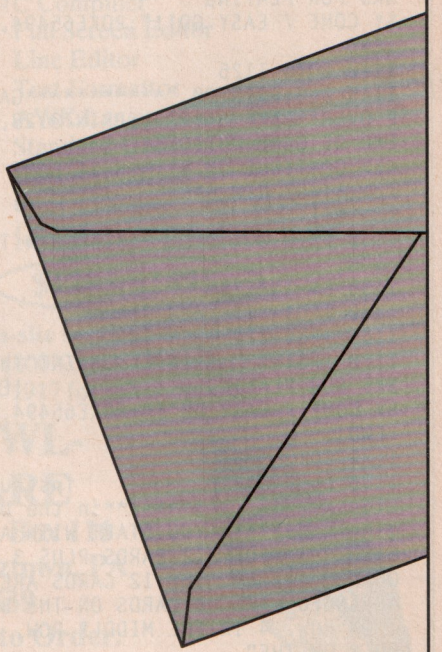

```
NKS FOR PLAYING                 'EA
SY COME / EASY GO'!":POKE65494,0
:END
1030 GOTO 1015
1035 'REM CHANGE CARD
1040 IFN<=6 AND A(15)=0 THEN A(1
5)=1:A$(N-1)=A$(15):GOTO105
1045 IFN>=7 AND N<=10 AND A(14)=
0 THEN A(14)=1:A$(N-1)=A$(14):GO
TO105
1050 IFN>11 AND A(13)=0 THEN A(1
3)=1:A$(N-1)=A$(13):GOTO105
1055 DRAW"BM10,184;XL$(14);":DRA
W"BM17,184;XL$(15);"
1060 GOTO435
1065 CLS:IFJJ<>0 THEN PRINT"DUE
TO CARELESS BETTING AND THE HOPE
S THAT THE CARDS WOULD PLAY IN Y
OUR FAVOR, YOU HAVE GONE";:M=0
1070 IFJJ=0 THEN PRINT"DUE TO UN
FORSEEN MYSTICISM IN   THE CARDS
 YOU DREW, THE JOKER   HIMSELF H
AS FORCED YOU";:M=0
1075 FORR=96 TO 416 STEP 32:G=R/
2: SOUNDG,1
1080 PRINT@R,"***********bankrup
t*************";
1085 FORX=1TO50:NEXTX:PRINT@R,"
                              "
;
1090 NEXTR
1095 FORR=416 TO 96 STEP-32:G=R/
2:PRINT@R,"
          ";:FORX=1TO25:NEXTX
1100 PRINT@R,"***********bankrup
t*************";
1105 SOUNDG,1
1110 NEXTR
1115 PRINT@448,"PRESS <E> TO END
 OR"
1120 PRINT@480,"PRESS <ENTER> TO
 START NEW GAME";
1125 G$=INKEY$
1130 IFG$=CHR$(13) THEN 60
1135 IFG$="E" THEN CLS:PRINT"THA
NKS FOR PLAYING                 'EA
SY COME / EASY GO'!":POKE65494,0
:END
1140 GOTO 1125
1145 CLS:PRINT@0,"***********GAM
E OVER************";:PRINT@128,"
END OF GAME OPTIONS:
<1> CONTINUE ON WITH NEXT GAME
<2> START NEW GAME
<3> QUIT";"
1150 PRINT@64,"YOU FINISHED WITH
 $"M;
1155 G$=INKEY$
1160 IFG$="1" THEN 75
1165 IFG$="2" THEN 60
1170 IFG$="3" THEN CLS:PRINT"THA
NKS FOR PLAYING                 'EA
SY COME / EASY GO'!":POKE65494,0
:END
1175 GOTO 1155
1180 CLS:PRINT"          instruc
tions          ********in the be
ginning********YOU START WITH A
GAME BOARD OF  12 CARDS PLUS 3 '
CHANGE CARDS'. THE 12 CARDS ARE
ARRANGED WITH  6 CARDS ON THE BO
TTOM ROW, 4 IN THE MIDDLE ROW, A
ND 2 ON THE"
1185 PRINT"TOP ROW. THERE IS 1 C
HANGE CARD SET OFF TO THE LEFT O
F EACH ROW.WHEN THE GAME IS FIRS
T STARTED, THE FIRST CARD ON THE
 BOTTOM ROWIS TURNED FACE-UP SO
AS TO SHOW THE VALUE OF IT. YOU
START WITH $20 AND ARE TRYING TO
 BREAK THE BANK."
1190 PRINT@480,"PRESS <ENTER> TO
 CONTINUE";
1195 G$=INKEY$
1200 IF G$=CHR$(13) THEN 1210
1205 GOTO 1195
1210 CLS:PRINT"          instruc
tions          **********play op
tions**********AFTER THE GAME IS
 STARTED YOU   HAVE THESE OPTION
S:                          <C>-CHANG
E CARD         THIS OPTION ALLOW
S YOU TO USE   THE 'CHANGE CARD'
 FOR YOUR ROW."
1215 PRINT"YOU MAY USE THIS OPTI
ON ONLY ONETIME PER ROW, SO USE
IT WISELY. YOU WOULD USE THIS OP
TION IF THECURRENT CARD IS NOT A
 VERY SAFE BET. FOR EXAMPLE, IF
YOUR CARD  WAS A 7, ODDS ON THE
NEXT CARD  ARE 50% HIGHER AND 50
% LOWER.   CHANGE THAT CARD!"
1220 PRINT@480,"PRESS <ENTER> TO
CONTINUE";
1225 G$=INKEY$
1230 IFG$=CHR$(13) THEN 1240
1235 GOTO 1225
1240 CLS:PRINT"          instruc
tions          **********play op
tions**********          <P>-PLAC
E BET          WHEN YOU GET A FA
IRLY SAFE CARD TO BET ON, USE TH
IS OPTION. IF  YOU HAVE A BAD CA
RD AND HAVE    ALREADY USED YOUR
 CHANGE OPTION"
1245 PRINT"THEN YOU MUST MAKE A
BET ANYWAY,BUT JUST MAKE A SMALL
 ONE TO BE SAFE. IF YOU GET A 2
THEN BET   EVERYTHING YOU HAVE B
ECAUSE THE NEXT CARD CANNOT BE L
OWER THAN  2. DITTO FOR THE ACE.
 NO CARD ISHIGHER THAN THE ACE."
1250 PRINT@480,"PRESS <ENTER> TO
 CONTINUE";
1255 G$=INKEY$
1260 IFG$=CHR$(13) THEN 1270
1265 GOTO 1255
1270 CLS:PRINT"          instruc
tions          **********play op
tions**********IF YOU MAKE A MIS
TAKE IN PLACINGYOUR BET, HIT THE
 BACKSPACE KEY AND THE SCREEN WI
LL BE REDRAWN  AND YOU CAN PLACE
 THE BET ALL   OVER AGAIN. AS YO
U TYPE IN YOUR"
1275 PRINT"BET, YOU WILL HEAR A
BEEP TO LETYOU KNOW THE NUMBER H
AS BEEN    ACKNOWLEDGED. HIT <EN
TER> AFTER YOU KEY IN THE LAST D
IGIT OF THEBET. IF YOUR BET IS 8
 DIGITS,   YOU DON'T HAVE TO HIT
 ENTER."
1280 PRINT@480,"PRESS <ENTER> TO
 CONTINUE";
1285 G$=INKEY$
1290 IFG$=CHR$(13) THEN 1300
1295 GOTO 1285
1300 CLS:PRINT"          instruc
tions          **********play op
tions**********AFTER YOUR BET IS
 PLACED, YOU   NEED TO TELL THE
COMPUTER IF YOUTHINK THE NEXT CA
RD WILL BE     HIGHER OR LOWER I
N VALUE. THIS  IS DONE USING THE
 UP AND DOWN"
1305 PRINT"ARROW KEYS, RESPECTIV
ELY. IF YOUHIT THE UP ARROW KEY,
 THE WORD  'HIGHER' WILL BE DISP
LAYED ON   THE SCREEN. HIT THE D
OWN ARROW  KEY AND THE WORD 'LOW
ER' WILL BEDISPLAYED. A FEW SECO
NDS LATER  'WINNER' OR 'LOSER' W
ILL BE DIS-PLAYED."
1310 PRINT@480,"PRESS <ENTER> TO
 CONTINUE";
1315 G$=INKEY$
1320 IFG$=CHR$(13) THEN 1330
1325 GOTO 1315
1330 CLS:PRINT"          instruc
tions          **********play op
tions**********IF YOU LOST THE B
ET. THE MONEY  WILL BE DEDUCTED
FROM YOUR      ACCOUNT. LIKEWISE
 IF YOU WIN THEBET, THE MONEY WI
LL BE ADDED TO YOUR ACCOUNT. NOW
 FOR THE SCARY"
1335 PRINT"PART, ON THE TOP ROW
THERE ARE  ONLY TWO CARDS, MEANI
NG ONLY ONEBET FOR THIS ROW. YOU
 MUST  BET AT LEAST HALF OF YOUR
 ACCOUNT   OR THE BET WON'T BE A
CKNOWLEDGEDAT ALL. THIS MAKES FO
R A QUICK  WAY TO WIN ALOT OR LO
SE ALOT,"
1340 PRINT@480,"PRESS <ENTER> TO
 CONTINUE";
1345 G$=INKEY$
1350 IFG$=CHR$(13) THEN 1360
1355 GOTO 1345
1360 CLS:PRINT"          instruc
tions          **********play op
tions**********THUS THE NAME 'EA
SY COME / EASY GO'! OF COURSE IN
 STRIVING TO   BREAK THE BANK YO
U WILL HIT MANYDOWNFALLS AND MAY
BE EVEN HIT THEJOKER WHICH MAKES
 YOU BANKRUPT"
1365 PRINT"AUTOMATICALLY. IT WIL
L TAKE MANYCONSECUTIVE GAMES TO
BREAK THE  BANK BUT IT REALLY CA
N BE DONE! ONCE THE BANK HAS BEE
N BROKEN   YOU WILL BE REWARDED
WITH A SONGAND A SARCASTIC REMAR
K ABOUT THEMONEY YOU WON (WISHIN
G IT WAS   REAL)."
1370 PRINT@480,"PRESS <ENTER> TO
CONTINUE";
1375 G$=INKEY$
1380 IFG$=CHR$(13) THEN 1390
1385 GOTO 1375
1390 CLS:PRINT"          instruc
tions          ******end of game
 options*******AT THE END OF EVE
RY GAME YOU AREGIVEN THE OPTION
TO CONTINUE    WITH YOUR PRESENT
 ACCOUNT, STARTA NEW GAME, OR QU
IT. IF YOU GO  BANKRUPT OR HIT T
HE JOKER, YOUR"
1395 PRINT"OPTIONS ARE TO START
A NEW GAME OR TO QUIT. IF YOU BR
EAK THE    BANK, YOU WILL GET YO
UR VICTORY SONG AND THE OPTIONS
TO START A NEW GAME OR QUIT. GOO
D LUCK AND HAVE FUN WITH 'EASY C
OME / EASY GO'. BREAK THAT BANK!
"
1400 PRINT@480,"HIT <ENTER> TO G
ET THINGS GOIN'";
1405 G$=INKEY$
1410 IFG$=CHR$(13) THEN 60
1415 GOTO 1405
```

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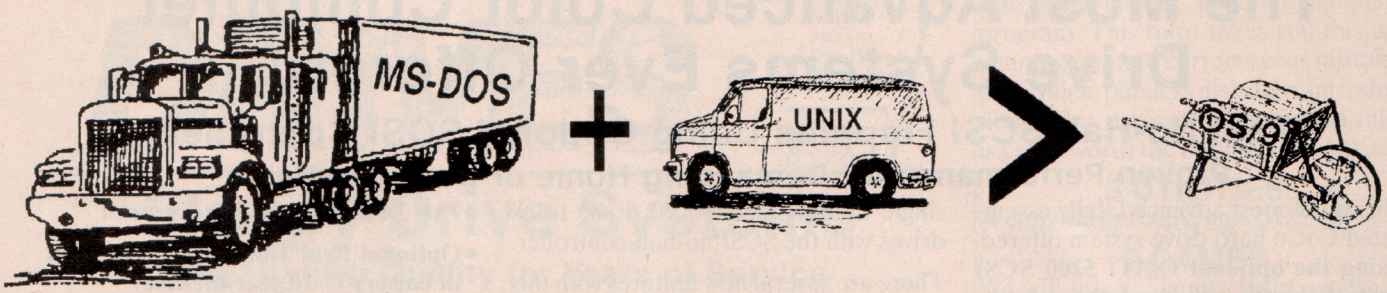

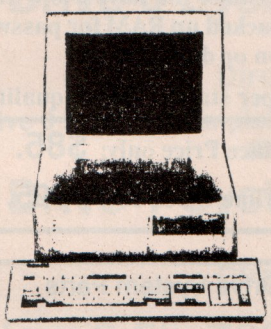

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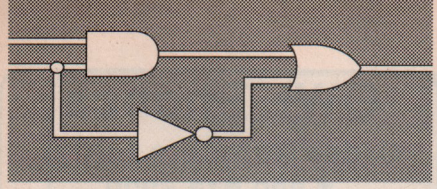
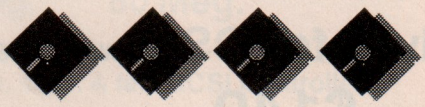


Making Directories

by Greg Law
Technical Editor

Recently I ran into a problem while installing new software and rearranging my hard drive. This particular problem involved creating dozens of directories, moving hundreds of files to new locations and removing the old directories. Moving the files wasn't much of a problem; `dsave` and `deldir` came to the rescue when I needed to remove the old directories. But simply put, `makdir` made my job a lot more difficult. I had planned to create directories several levels deep, but `makdir` can only create one directory at a time. This proved a slow and cumbersome process. After a few moments of debate, I finally decided that it shouldn't be difficult to write a version of `makdir` to automatically create multiple-level directories. For example, in an attempt to create `/dd/SOURCE/GAMES/SMASH`, the new version of `makdir` should create `/dd/SOURCE` and `/dd/SOURCE/GAMES`, if necessary, and then create `/dd/SOURCE/GAMES/SMASH`.

The first obstacle was to split the pathlist into its individual components. Since the slash is used to separate each component, a search routine can be used to locate each slash. Rather than reinventing the wheel, I decided to browse through the C compiler manual to see if any of the library functions would help. On pages 4-29 and 4-30, I saw that `index()` returns a pointer to the first occurrence of the specified character in a string and `rindex()` returns a pointer to the last occurrence of the specified character. Both functions return `NULL` (or zero) if the character is not found in the string. Before I sat down to write the program, I considered the possible variations to the pathlist. The program must handle *full pathlists* and *relative pathlists*. A full pathlist always starts with the drive name and contains every directory name needed to locate the desired file or directory, such as `/dd/SOURCE/GAMES/SMASH`. A relative pathlist refers to the desired file or directory from the current directory, which might be `SOURCE/GAMES/SMASH`, `GAMES/SMASH`, or `.../SOURCE/GAMES/SMASH`.



Taking this into account made the job a little more complex. Since there are two basic methods of creating the same directory, the program should be written to handle both methods without any side effects. Assume the current directory is the root directory of drive `/dd`. To create the desired directory, the basic pathlist given to `makdir` can be one of the following:

```
/dd/SOURCE/GAMES/SMASH
.../SOURCE/GAMES/SMASH
SOURCE/GAMES/SMASH
```

Now that we can see the various pathlists next to each other, the differences are a little easier to determine. One of the problems as I see it, is that the program should never attempt to create the root directory. This means the program needs to skip `/dd` and create `/dd/SOURCE` first. Another problem is that the program should never attempt to create an *anonymous directory*. An anonymous directory is a series of one or more periods that refers to the current or higher-level directories (as in the second pathlist above).

Now that the exceptions have been defined, we can form two rules to handle them. Rule 1: If the pathlist begins with a slash, skip the drive name. Rule 2: If the pathlist begins with a period, skip the anonymous directories. These rules can be applied using two simple `if` statements.

```
if(path[0] == '/')
if(path[0] == '.')
```

These statements compare the first character in the string to a slash and a period, respectively. Now we need to determine what methods can be used to apply these exceptions. In the pathlists above, both the drive name and anonymous directories are separated from the first directory name by a slash. To handle the exceptions, the program needs to skip the first two slashes if the pathlist begins with a slash and the first slash if the pathlist begins with a period. That is, the first directory created should be `/dd/SOURCE` or `.../SOURCE`.

Both exceptions can be handled with one routine. Remember, `index()` returns a pointer to the first occurrence of a specified character in a string. A dummy pointer can be used to point to the second character in the string. The code used for this can be defined as `ptr = path + 1`, where `path` is the original pointer to the string. This allows `index()` to locate the slash immediately preceding the first actual directory name to be created. As viewed through the dummy pointer (`ptr`), both strings are as follows:

```
dd/SOURCE/GAMES/SMASH
../SOURCE/GAMES/SMASH
```

In addition to being OS-9 Online SIGop, Greg Law enjoys programming on all types of computers and has worked on systems ranging from the CoCo to the Burroughs B6700 super mainframe. He lives in Louisville, Kentucky.

The Listing: makedir.c

```
#include <modes.h>
#include <stdio.h>
#include <string.h>

main(argc, argv)
int  argc;
char *argv[];
{
     char *path;
     char *ptr;
     int  i = 0;

     if(argc < 2)
          help(argv[0]);

     while(--argc)
     {
          ptr = path = argv[++i];

          if(path[0] == '/' || path[0] == '.')
               ptr = index(ptr + 1, '/') + 1;

          while((ptr = index(ptr, '/')) != 0)
          {
               *ptr = '\0';
               I_MakDir(path);
               *ptr = '/';
               ptr++;
          }
          I_MakDir(path);
     }
}

I_MakDir(path)
char *path;
{
     int status;

     status = mknod(path, 077);

     if(status == -1)
          printf("%-40s -- ERROR %03d\n", path, errno);
     else
          printf("%-40s -- created\n", path);
}

help(name)
char *name;
{
     printf("This utility is used to create multiple directories\n");
     printf("and subdirectories in one pass. It will also create\n");
     printf("all directories specified in a pathlist as required\n");
     printf("\n");
     printf("The syntax for %s is: \n", name);
     printf("     %s pathlist <pathlist> <...>\n", name);

     exit(0);

}
```

Now index() can be used with the dummy pointer to locate the first slash. The address returned can also be assigned to the dummy pointer since the original address is no longer needed. The code used to perform this step can be defined as

```
ptr = index(ptr, '/');
```

At this point, both strings are /SOURCE/GAMES/SMASH. All that remains is to increment the dummy pointer by one address (ptr++) so that it skips this slash. This makes the string SOURCE/GAMES/SMASH. Tying all of this together, the exception handler can now be written as shown in Figure 1a.

```
ptr = path;

if(path[0] == '/' || path[0] == '.')
{
     ptr++;
     ptr = index(ptr, '/');
     ptr++;
}
```

Figure 1a

```
ptr = path;

if(path[0] == '/' || path[0] == '.')
     ptr = index(ptr + 1, '/') + 1;
```

Figure 1b

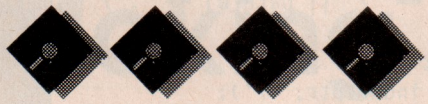
```
while((ptr = index(ptr, '/')) != NULL)
     ptr++;
```

Figure 2a

```
while((ptr = index(ptr, '/')) != NULL)
{
     *ptr = '\0';
     I_MakDir(path);
     *ptr = '/';
     ptr++;
}
```

Figure 2b

Remember, the pointer is incremented the first time to skip the initial slash or period. The pointer is incremented the second time to skip the slash preceding the first directory name to be created. Now the initial exception handler can be shortened by rearranging the increments as shown in Figure 1b.



At this point, the program deals with one type of pathlist regardless of the actual pathlist passed on the command line. Remember, path is still pointing to the original string. Now a loop can be used to create each of the subdirectories as required. Before continuing any further, we must determine the type of loop used and the conditions of the loop. We know that index() returns NULL if the specified character isn't found in the string. We also need to increment the dummy pointer at the bottom of the loop so that index() finds the next slash. Otherwise, index() keeps finding the same slash over and over. With this in mind, a while loop can be used as shown in Figure 2a.

Now that the program is stepping through each of the slashes, you need to determine how to separate the components and create the actual directories. One method is to use a string-copy routine. Since path always points to the original string and ptr points to the current slash, the length of the current pathlist string can be determined by subtracting path from ptr:

```
length = ptr - path;
strncpy(name, path, length);
```

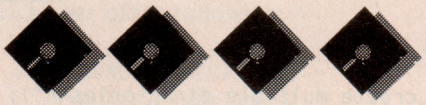
Although this method works, it is more complex and slower than what I want. Remember, ptr always points to the current slash in the pathlist. Also, C terminates strings with a NULL character. Any ideas? What would happen if the current slash was replaced with a NULL character? Since the string is terminated at the current slash, path would effectively point to the current pathname and the remainder of the string would be ignored. After stuffing the NULL character into the string, the directory could be created. However, the original slash needs to be stuffed back into the string before incrementing ptr. Otherwise the program would create the first directory over and over. Now the loop can be built as shown Figure 2b.

Examine the loop and step through it mentally using the pathlist /dd/SOURCE/GAMES/SMASH. On entry to the loop, ptr points to SOURCE/GAMES/SMASH and path points to /dd/SOURCE/GAMES/SMASH. When the loop is entered the first time, ptr points to GAMES/SMASH and path points to /dd/SOURCE. On the second pass, ptr points to SMASH and path points to /dd/SOURCE/GAMES. This brings up an important point. On the third pass through the loop, index() returns NULL because there are no more slashes in the string and the loop is terminated. This means the last directory isn't created in the loop. But the string pointed to by path is restored to its original state so the program can call I_MakDir(path) immediately below the loop to create the final directory.

Now that the basic foundation is built, you can focus on the last detail, which is handling multiple pathlists from the command line. On entry to the program, argc contains the number of arguments passed on the command line and argv is an array of pointers to the command line parameters. The first argument is always the name of the program, so argv[0] should be skipped. Therefore, the first loop in the program can be defined as:

```
i = 0;
while(--argc)
{
   path = argv[++i];
   ptr = path;
   .
   .
   .
}
```

Note that pre-increment and pre-decrement operators are used so the values are incremented and decremented *before* being used. Remember, you don't want to use argv[0], so i is incremented to a value of 1 before the assignment path = argv[i] is executed. Also, since the first argument is not being used, argc is decrement before it is compared to non-zero. This keeps argc one argument behind and i one argument ahead.



The complete program is shown in Listing 1. Last minute additions include the creation of the I_MakDir() and help() functions as well as the test at the beginning of the program. This test makes sure that at least two arguments are passed on the command line — the name of the program and the pathlist of at least one directory. If less than two arguments are passed, the help() function is called to explain how to use the program.

The I_MakDir() function calls the mknod() function to actually create the directory and checks the status returned from mknod(). If mknod() created the directory without any errors, the pathlist is printed on the screen followed by the word "created." Otherwise the pathlist is printed on the screen followed by the error code. The program continues creating the directories regardless of the status.

You may want to add additional error checking to the I_MakDir() function. If mknod() returns an error condition, you can determine which error was detected by examining the contents of errno. The most common errors are:

214 — no permission: The program may as well give up and continue with the next pathlist, if any, since it will not be able to create any subdirectories under this one.

215 — bad pathname: This should be treated the same as Error 214. If the current directory name contains an illegal character, all of the subdirectories referenced in this pathlist may as well contain illegal characters.

218 — file already exists: The program should continue since the user may be creating subdirectories under pre-existing directories.

235 — bad name: Same as Error 215.

237 — system memory full: The program should give up totally because the kernel doesn't have enough free memory to perform the operation.

240-249 — device errors: These errors are caused by a physical hardware problem in the drive or a defect in the media. There's nothing the program can do about the error, so it should exit immediately.

250 — device busy: Another process has the drive open in non-sharable mode. Sleep for a while and try again.

252 — record is locked: Another process is updating the directory. Sleep for a while and try again.

253 — non-sharable file busy: Another process has the directory opened in non-sharable mode. Sleep for a while and try again.

You may also want to check the validity of the parameters passed on the command line. An unsuspecting user may be trying to figure out how to use the program by passing wild arguments.

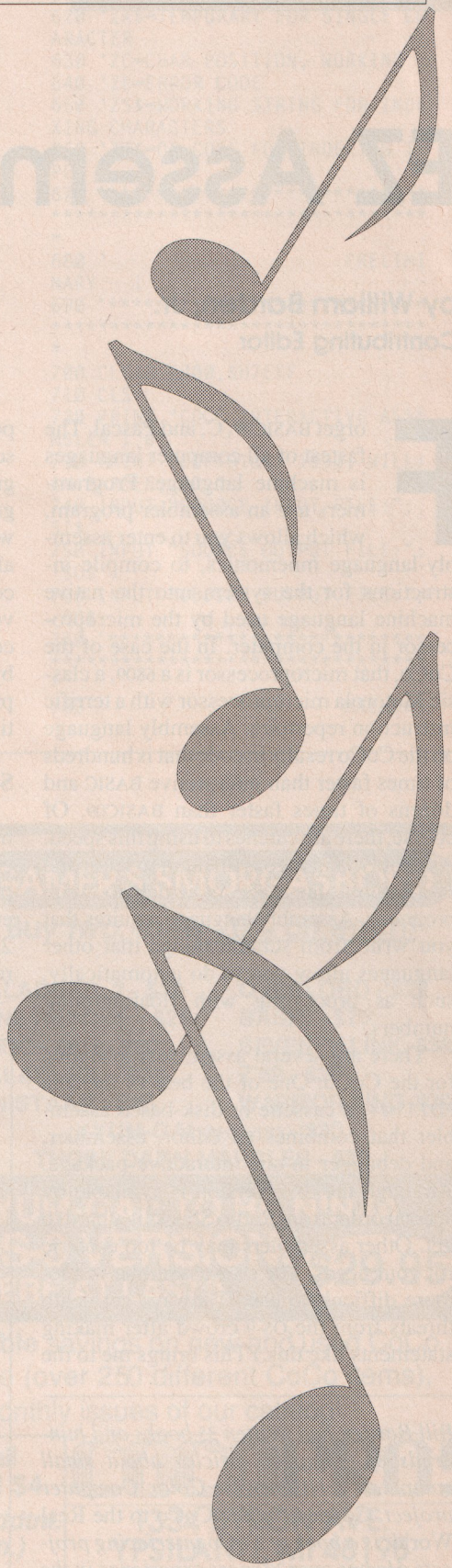
Music Test

By Perry Friesen

Music Test is a program designed to help budding musicians learn the lines and spaces on the treble and bass clefs. So put away those flashcards and enjoy a colorful Hi-Res display while you learn. *Music Test* first draws a play screen featuring a graphics display of the grand staff (both the treble and bass staves together). The program uses the RND function to select a note. Then it plays that note and displays a quarter note in the appropriate position for the pitch. You must then press the letter on the keyboard that corresponds with the displayed note. The TIMER function limits the response time, which can be changed by modifying Variable TM. If the response is correct, *Music Test* affirms your choice. If the response is not correct, the correct note is displayed.

The Listing: MUSICTST

```
1 'MUSIC TEST
2 'WRITTEN BY PERRY FRIESEN
3 'COPYRIGHT (C) APRIL 1991
4 'BY FALSOFT, INC.
5 'RAINBOW MAGAZINE
10 HBUFF 1,300
20 POKE65497,0
30 A$="C4;BM34,105;D2F2R2E2U51E2
R2F2D4GDGDGDGDGDGDGDGDGDGDGD
2GD4FDFDFRFRFR4ERERERUEUEU4HUHUHL
HL4GLGLGDGD4F
40 B$="C4;BM35,132;LH2U4EUERERER
2FRFRF3DFD6GD2GD2GDGDGDGDGLDLDLD
BU27BR14RDLUBD10RDLU
50 C$="C7;D2FU4ED5FU7RD7RU7ED8RU
8RD7RU7FD6EU4D4EU30
60 HSCREEN 2:HCLS2:POKE&HFF9A,11
70 A=50:NC=0:TT=10:C=0:TM=300
80 '***DRAW PLAY SCREEN***
90 HCOLOR8:HPRINT(7,0),"** M U S
 I C   T E S T **":HCOLOR4
100 FOR I=1TO5
110 A=A+10:HLINE(30,A)-(290,A),P
SET
120 NEXT I
130 A=A+10
140 FOR I=1TO5
150 A=A+10:HLINE(30,A)-(290,A),P
SET
160 NEXT I
170 HLINE(30,60)-(30,160),PSET:H
LINE(287,60)-(287,160),PSET:HLIN
E(290,60)-(290,160),PSET
180 HDRAW A$+B$:POKE65496,0
190 '***MAIN LOOP***
200 C=C+1:TIMER=0:N=RND(25):V=N*
5+45
210 FORI=1TO25
220 READ NN,P$,II$
230 IFNN=N THEN250
240 NEXT I
250 RESTORE:HCOLOR4,2:HLINE(30,1
80)-(290,192),PRESET,BF:HGET(160
,V-30)-(175,V+5),1:HDRAW "BM160,
"+STR$(V)+";"+C$
260 PLAYP$
270 I$=INKEY$:IFTIMER>TM THEN380
ELSEIFI$=""THEN270
280 HCOLOR4:IFI$<"A"ORI$>"G"THEN
HPRINT(10,24),"That's not a note
!":GOTO390
290 IF I$=II$ THENGOSUB420ELSE38
0
300 HPUT(160,V-30)-(175,V+5),1,P
SET:IFC<>TT THEN200
310 NC$=STR$(NC):NW$=STR$(TT-NC)
:SC$=STR$(NC/TT*100)
320 HCOLOR0:HPRINT(2,2),"Number
correct:"+NC$
330 HPRINT(22,2),"Number wrong:"
+NW$
340 HPRINT(12,4),"Your score:"+S
C$+"%"
350 HPRINT(2,21),"** PRESS <CLEA
R> FOR ANOTHER TEST **"
360 I$=INKEY$:IFI$=""THEN360
370 IFI$=CHR$(12)THEN20ELSEEND
380 HCOLOR4:HPRINT(12,24),"Right
 answer is "+II$
390 PLAY"L8O3FDFD":GOTO300
400 DATA 1,O4A,A,2,O4G,G,3,O4F,F
,4,O4E,E,5,O4D,D,6,O4C,C,7,O3B,B
,8,O3A,A,9,O3G,G,10,O3F,F,11,O3E
,E,12,O3D,D,13,O3C,C,14,O2B,B,15
,O2A,A
410 DATA 16,O2G,G,17,O2F,F,18,O2
E,E,19,O2D,D,20,O2C,C,21,O1B,B,2
2,O1A,A,23,O1G,G,24,O1F,F,25,O1E
,E
420 HCOLOR4:HPRINT(12,24),I$+" i
s correct":NC=NC+1:PLAY"L10O3CEG
O4CO3GO4L4C":RETURN
```



EZ Assembler

by William Barden, Jr.
Contributing Editor

Forget BASIC09, C, and Pascal. The fastest of all computer languages is machine language. Programmers use an assembler program, which allows you to enter assembly-language mnemonics, to compile instructions for the system into the native machine language used by the microprocessor in the computer. In the case of the CoCo, that microprocessor is a 6809, a classic Motorola microprocessor with a terrific instruction repertoire. Assembly language on the CoCo results in code that is hundreds of times faster than interpretive BASIC and dozens of times faster than BASIC09. Of course, there are catches to using this speed. Assembly language is difficult to learn and is a tedious language in which to write programs. Assembly language requires that you write from scratch things that other languages allow you to do automatically, such as processing with floating-point numbers.

There are several assemblers available for the CoCo. One of the best of these is *EDTASM+*, a cassette or disk-based assembler that combines an editor, assembler, and debugger in one interactive package. Although the disk version is available by special order from Radio Shack, it's hard to get. Other assemblers may be too esoteric for your needs. The OS-9 assembler is a lot more difficult to use. (I always get death threats from the OS-9 crowd after making statements like this.) This brings me to the point — *Barden's EZASM*. This is a simple, screen-oriented CoCo 3 assembler that may give you the flavor of what assembly language is all about before you go into it whole hog. *EZASM* uses a powerful subset of all 6809 instructions. This subset should cover 95 percent of your needs. It's also very easy to use, and the mnemonics and codes are generally the standard ones used by Motorola and *EDTASM+*. Along with providing the code, I'll provide instructions about assembly language in general.

Source for the Assembler

So you can get started immediately, let me provide the code. The listing is the complete BASIC program for *EZASM*. The program runs only on a CoCo 3. I considered allowing for the use of the CoCo 1 and 2 for the assembler, but the whole package relies on using several dozen screen lines — something the CoCo 1 and 2 do not support. The listing is quite long, so be extra careful as you enter it.

If you find the program difficult to enter, I'll be happy to send you a copy. To make it easy on your columnist, send a stamped, self-addressed disk mailer with suitable backing material. Also, include a formatted 35-track standard CoCo disk. Do not include a 200-page listing with several dozen questions to be answered about the listing and the meaning of life. (I set things like this aside, meaning to answer them when I get time, and they're never seen again...). Send to:

William Barden, Jr.
P.O. Box 3568
Mission Viejo, CA 92692

That's all until next month, at which time we'll look at how to use *EZASM* when entering assembly-language programs. ❑

Bill Barden has written 35 books and hundreds of magazine articles about small computers . His newest Color Computer project, Connecting the CoCo to the Real World, *is a book of CoCo interfacing projects. He has over 20 years experience in the industry on systems ranging from mainframes to micros.*

CoCo 3 Disk

```
17Ø ..... 76    1Ø5Ø ..... 13    2Ø1Ø ..... 161   281Ø ..... 1Ø9
28Ø ..... 2ØØ   114Ø ..... 171   211Ø ..... 15Ø   291Ø ..... 11
38Ø ..... 1Ø8   122Ø ..... 19Ø   218Ø ..... 1Ø3   3ØØØ ..... 72
49Ø ..... 78    132Ø ..... 217   225Ø ..... 212   3Ø9Ø ..... 218
61Ø ..... 3     142Ø ..... 2ØØ   234Ø ..... 4Ø    315Ø ..... 237
69Ø ..... 232   152Ø ..... 126   241Ø ..... 232   322Ø ..... 194
78Ø ..... 217   164Ø ..... 94    247Ø ..... 197   329Ø ..... 126
83Ø ..... 91    172Ø ..... 227   254Ø ..... 8Ø    34ØØ ..... 229
87Ø ..... 177   181Ø ..... 146   261Ø ..... 118   348Ø ..... 1ØØ
96Ø ..... 154   191Ø ..... 94    269Ø ..... 144   END ..... 192
```

The Listing: EZASM

```
1ØØ ' COCO INTERACTIVE ASSEMBLER
11Ø ' COPYRIGHT 199Ø, WILLIAM BA
RDEN, JR.
12Ø '*****************************
*********************************
*
13Ø '                        DATA D
ICTIONARY
```

```
140 '*****************************
*********************************
*
150 'A$=TEMPORARY VARIABLE
160 'AA$=ALLOWABLE ADDRESSING MO
DES
170 'AL=1 IF BINARY DATA ON SCRE
EN
180 'AM$=CURRENT ADDRESSING MODE
 CHARACTER CODE
190 'AM=DECODED ADDRESSING MODE
200 'CH=1 IF LINE CHANGED
210 'CP=SCREEN CHARACTER POSITIO
N, Ø TO 79
220 'DI=DISPLACEMENT VALUE OF OP
ERAND
230 'E1=EA MS BYTE
240 'E2=EA LS BYTE
250 'EA=COMPUTED EFFECTIVE ADDRE
SS
260 'EB=LAST BINARY DATA LOCATIO
N
270 'I=GENERAL WORKING INDEX
280 'J=GENERAL WORKING INDEX
290 'L$(22)=SCREEN LINE ARRAY
300 'LI=NUMBER OF BYTES IN MACHI
NE CODE
310 'LO=CURRENT LOCATION FOR BIN
ARY
320 'LR=LAST SOURCE ROW USED
330 'M1$=ALL ONE-BYTE OP CODES
340 'M2$=ALL TWO OR THREE-BYTE O
P CODES
350 'M3$=ALL THREE OR FOUR-BYTE
OP CODES
360 'ML$=CURRENT PARTIAL OP CODE
 STRING
370 'MM$=FIRST BYTE OF MACHINE L
ANGUAGE
380 'MN=NUMERIC VALUE OF MNEMONI
C
390 'MS$=SECOND BYTE OF MACHINE
LANGUAGE
400 'NA=0 IF NO BINARY, 1 IF BIN
ARY ON SCREEN
410 'NV=NUMERIC VALUE OF OPERAND
420 'OB$=ALL ONE-BYTE MNEMONICS
430 'OO$=OBJECT OUTPUT FILE NAME
440 'PN=PASS NUMBER, Ø OR 1
450 'PS$=ALL PSEUDO OPS, MNEMONI
CS
460 'RW=SCREEN ROW, Ø TO 22
470 'S(26)=SYMBOL TABLE
480 'SA=STARTING ADDRESS FOR ASS
EMBLED PROGRAM
490 'SB=FIRST BINARY DATA LOCATI
ON
500 'SC=SAVE CHARACTER POSITION
510 'SG=SIGN OF RELATIVE DISPLAC
EMENT
520 'SI$=SOURCE INPUT FILE NAME
530 'SO$=SOURCE OUTPUT FILE NAME
540 'SR=SAVE ROW
550 'ST$=FCC STRING
560 'SY=CURRENT SYMBOL, WORKING
570 'T1$=ALL TWO OR THREE-BYTE M
NEMONICS, PART ONE
580 'T2$=ALL TWO OR THREE-BYTE M
NEMONICS, PART TWO
590 'TH$=ALL THREE OR FOUR BYTE
MNEMONICS
600 'Y=GENERAL WORKING INDEX
610 'Z$=GENERAL WORKING STRING
620 'ZA$=TEMPORARY FOR SINGLE CH
ARACTER
630 'ZC=CHAR POSITION, WORKING
640 'ZE=ERROR CODE
650 'ZS$=WORKING STRING FOR INDE
XING CHARACTERS
660 'ZT$=OP CODE FOR INDEXING TY
PE
670 '*****************************
*********************************
*
680 '                        PRELIMI
NARY - 1
690 '*****************************
*********************************
*
700 CLEAR 2000,&H7EFF
710 CLS
720 PRINT "COCO INTERACTIVE ASSE
MBLER 1.Ø"
730 PRINT "COPYRIGHT 1990, WILLI
AM BARDEN, JR."
740 INPUT "SOURCE INPUT FILE:";
SI$
750 INPUT "SOURCE OUTPUT FILE:";
 SO$
760 INPUT "OBJECT OUTPUT FILE:";
 OO$
770 '*****************************
*********************************
*
780 '                        MNEMONI
```


HARDWARE SPECIALS

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```
CS AND OP CODES
790 '**************************
*********************************
*
800 'ONE-BYTE INSTRUCTIONS - NO
FOLLOWING BYTES - 0 TO 29
810 OB$="ABX  ASLA ASLB ASRA ASR
B CLRA CLRB COMA COMB DAA  DECA
DECB INCA INCB LSLA LSLB LSRA LS
RB MUL  NEGA NEGB NOP  ROLA ROLB
 RORA RORB RTS  SEX  TSTA TSTB "
820 M1$="3A485847574F5F4353194A5
A4C5C485844543D40501249594656391
D4D5D"
830 'TWO- OR THREE-BYTE INSTRUCT
IONS DEPENDING UPON IMMEDIATE OR
 EXTENDED OPRND
840 '30 TO 103
850 T1$="ADCA ADCB ADDA ADDB ADD
D ANDA ANDB ANDCCASL  ASR  LBCC
LBCS LBEQ LBGE LBGT LBHI LBHS BI
TA BITB LBLE LBLO LBLS LBLT LBMI
 LBNE LBPL LBRA LBRN LBSR LBVC L
BVS CLR  "
860 T2$="CMPA CMPB CMPX COM  DEC
  EORA EORB INC  JMP  JSR  LDA
LDB  LDD  LDU  LDX  LEAS LEAU LE
AX LEAY LSL  LSR  NEG  ORA  ORB
 ORCC PSHS PSHU PULS PULU ROL  R
OR  SBCA SBCB STA  STB  STD  STU
  STX  SUBA SUBB SUBD TST  "
870 M2$="89C98BCBC384C41C4847242
5272C2E222485C52F25232D2B262A162
11728294F81C18C434A88C84C4E8D86C
6CCCE8E121310114844408ACA1A34363
537494682C287C7CDCF8F80C0834D"
880 'INSTRUCTIONS OTHER THAN REL
ATIVE WITH LEADING 10
890 '104 TO 111
900 TH$="CMPD CMPS CMPU CMPY LDS
  LDY  STS  STY  "
910 M3$="1083118C1183108C10CE108
E10CF108F"
920 'PSEUDO-OPS - 112 TO 115
930 PS$="FCB  FCC  FDB  ORG  "
940 'ALLOWABLE ADDRESSING MODES.
 SUBTRACT HEX 40 TO FIND 000BEIX
R WHERE
950 'B IS OP BYTE (B=0);E=EXTEND
ED;I=IMMEDIATE;X=INDEXED;R=RELAT
IVE.
960 AA$="..........................
.......NNNN^NNDJJAAAAAAANNAAAAAA
AAAAAAJNN^JJNNJZZNN^^^BBBBJJJNND
DDDDJJNNJJZZZNN^J^^^^^^JJ...."
970 '**************************
*********************************
*
980 '                          PREL
IMINARY - 2
990 '**************************
*********************************
*
1000 DIM L$(22), S(26)
1010 HSCREEN 4
1020 HBUFF 1,300
1030 HGET(0,0)-(111,7),1
1040 GOSUB 3390
1050 '**************************
*********************************
**
1060 '
MAIN LOOP
1070 '**************************
*********************************
**
1080 LR=-1
1090 PN=0
1100 AL=0
1110 GOSUB 1220
1120 IF CP<53 THEN HLINE(13*8,RW
*8)-(13*8+7,RW*8+7),PRESET,BF EL
SE                    HLINE(53*8,
RW*8+7)-(53*8+7,RW*8+7),PRESET,B
F
1130 GOSUB 2140
1140 RW=RW+1
1150 IF RW=23 THEN RW=0: IF CP<4
0 THEN CP=54 ELSE CP=14
1160 IF CP>53 THEN CP=54 ELSE CP
=14
1170 GOTO 1110
1180 '**************************
*********************************
**
1190 '
 EDITOR
1200 '**************************
*********************************
**
1210 'SUBROUTINE TO ENTER LINE O
F TEXT
1220 ZA$=INKEY$: IF ZA$="" THEN
HLINE (CP*8,RW*8+7)-(CP*8+7,RW*8
+7),PSET,B:           HLINE (CP*8
,RW*8+7)-(CP*8+7,RW*8+7),PRESET,
B: GOTO 1220
1230 '***UP ARROW***
1240 IF ZA$<>CHR$(94) THEN GOTO
1300
1250 IF CH=1 THEN CH=0: GOSUB 21
40
1260 RW=RW-1
1270 IF RW<>-1 THEN GOTO 1220
1280 IF CP>39 THEN RW=22: CP=14:
 GOTO 1220 ELSE RW=22: CP=54: GO
TO 1220
1290 '***DOWN ARROW***
1300 IF ZA$<>CHR$(10) THEN GOTO
1360
1310 IF CH=1 THEN CH=0: GOSUB 21
40
1320 RW=RW+1
1330 IF RW<>23 THEN GOTO 1220
1340 IF CP>39 THEN RW=0: CP=14:
GOTO 1220 ELSE RW=0: CP=54: GOTO
 1220
1350 '***LEFT ARROW***
1360 IF ZA$<>CHR$(8) THEN GOTO 1
400
1370 CP=CP-1
1380 IF CP=13 THEN CP=38: GOTO 1
220 ELSE IF CP=53 THEN CP=78:GOT
O 1220 ELSE           GOTO 1220
1390 '***RIGHT ARROW***
1400 IF ZA$<>CHR$(9) THEN GOTO 1
440
1410 CP=CP+1
1420 IF CP=39 THEN CP=14: GOTO 1
220 ELSE IF CP=79 THEN CP=54: GO
TO 1220 ELSE          GOTO 1220
1430 '***CLEAR CURRENT PROGRAM**
*
1440 IF ZA$<>CHR$(12) THEN GOTO
1490
1450 ZA$=INKEY$: IF ZA$="" THEN
GOTO 1450 ELSE IF ZA$<>CHR$(12)
THEN GOTO 1490
1460 GOSUB 3390
1470 RETURN
1480 '***F1=ASSEMBLE, SAVE SOURC
E AND BINARY***
1490 IF ZA$<>CHR$(103) THEN GOTO
 1650
1500 PN=1
1510 GOSUB 3530
1520 LO=&H7F00: SC=CP: SR=RW: CP
=14
1530 FOR RW=0 TO 22: GOSUB 2150:
 NEXT
1540 CP=54
1550 FOR RW=0 TO 22: GOSUB 2150:
 NEXT
1560 OPEN"O",#1,SO$
1570 FOR I=0 TO 22: WRITE#1,L$(I
): NEXT I
1580 CLOSE 1
1590 IF SB<>0 THEN SAVEM OO$,SB,
EB,SA
1600 CP=SC: RW=SR
1610 AL=1
1620 PN=0
1630 GOTO 1220
1640 '***F2=READ SOURCE, NO BINA
RY***
1650 IF ZA$<>CHR$(4) THEN GOTO 1
810
1660 GOSUB 3510
1670 HCLS
1680 OPEN"I",#1,SI$
1690 CP=14: RW=0
1700 FOR I=0 TO 22: INPUT#1, L$(
I): NEXT
1710 FOR I=0 TO 22: IF MID$(L$(I
),1,39)=STRING$(39," ") THEN HPR
INT (0,I),            "
   . ..... ..... .........": N
EXT ELSE HPRINT (0,I),
     MID$(L$(I),1,39): NEXT
1720 FOR I=0 TO 22: HPRINT (39,I
),A$: NEXT
1730 FOR I=0 TO 22: IF MID$(L$(I
),41,38)=STRING$(38," ") THEN HP
RINT (40,I),          "
   . ............ .........":
NEXT ELSE HPRINT (40,I),
     MID$(L$(I),41,38): NEXT
1740 GOSUB 3570
1750 CLOSE 1
1760 LO=&H7F00: PN=0: CP=14
1770 FOR RW=0 TO 22: GOSUB 2150:
 NEXT
1780 CP=54
1790 RW=0: CP=14
1800 GOTO 1220
1810 '***LOOK FOR SHIFT, UP ARRO
W***
1820 IF ZA$<>CHR$(95) THEN GOTO
1940
1830 IF AL=1 GOSUB 3510: AL=0
1840 IF CP>40 THEN J=RW: GOTO 18
90
1850 IF RW=22 THEN GOTO 1870
1860 FOR I=RW TO 21: MID$(L$(I),
1,38)=MID$(L$(I+1),1,38): NEXT
1870 MID$(L$(22),1,38)=MID$(L$(0
),41,80)
1880 J=0
1890 IF J=22 THEN GOTO 1910
1900 FOR I=J TO 21: MID$(L$(I),4
1,80)=MID$(L$(I+1),41,80): NEXT
1910 MID$(L$(22),41,80)="
                                "
1920 HCLS: GOSUB 1710
1930 RETURN
```

```
1940 '***LOOK FOR SHIFT, DOWN AR
ROW***
1950 IF ZA$<>CHR$(91) THEN GOTO
2050
1960 IF AL=1 THEN GOSUB 3510: AL
=0
1970 IF CP>40 THEN J=RW ELSE J=0
1980 FOR I=21 TO J STEP -1: MID$
(L$(I+1),41,39)=MID$(L$(I),41,29
): NEXT
1990 MID$(L$(J),41,39)="
                                "
2000 IF CP>40 THEN GOTO 2040
2010 MID$(L$(0),41,39)=MID$(L$(2
2),1,38)
2020 FOR I=21 TO RW STEP -1: MID
$(L$(I+1),1,38)=MID$(L$(I),1,38)
: NEXT
2030 MID$(L$(RW),1,38)="
                                "
2040 GOTO 1920
2050 CH=1
2060 IF ZA$=CHR$(13) THEN RETURN
2070 GOSUB 3290: HPRINT (CP,RW),
ZA$
2080 CP=CP+1
2090 IF ((CP=39) OR (CP=79)) THE
N RETURN
2100 GOTO 1220
2110 '*************************
*****************************
**
2120 '                          A
SSEMBLER
2130 '*************************
*****************************
**
2140 'SUBROUTINE TO PROCESS LINE
 OF TEXT
2150 IF CP>53 THEN ZC=55 ELSE ZC
=15
2160 IF MID$(L$(RW),ZC,14)="
          " THEN RETURN
2170 '***FIRST PROCESS POSSIBLE
SYMBOL***
2180 IF MID$(L$(RW),ZC,1)<>" " T
HEN SY=ASC(MID$(L$(RW),ZC,1)) EL
SE GOTO 2220
2190 IF MID$(L$(RW),ZC+1,1)<>" "
 THEN ZE=2: GOTO 3330
2200 IF ((SY>64) AND (SY<91)) TH
EN GOTO 2210 ELSE ZE=1: GOTO 333
0
2210 SY=SY-65: IF S(SY)=-1 THEN
S(SY)=LO ELSE IF (PN=0) AND (S(S
Y)<>LO) THEN                ZE=1: G
OTO 3330
2220 '***NOW FIND 5 CHARACTERS O
F MNEMONIC***
2230 ZC=ZC+2
2240 IF MID$(L$(RW),ZC+5,1)<>" "
 THEN ZE=2: GOTO 3330
2250 MN=INSTR(OB$,(MID$(L$(RW),Z
C,5))): IF MN=0 THEN GOTO 2300
2260 IF MID$(L$(RW),ZC+5,7)<>"
     " THEN ZE=3: GOTO 3330
2270 MN=(MN-1)/5
2280 ML$=MID$(M1$,MN*2+1,2)
2290 GOTO 2610
2300 MN=INSTR(T1$,MID$(L$(RW),ZC
,5)): IF MN<>0 THEN MN=(MN-1)/5:
 GOTO 2320
2310 MN=INSTR(T2$,MID$(L$(RW),ZC
,5)): IF MN=0 THEN GOTO 2330 ELS
E MN=(MN-1)/5 +       32
2320 ML$=MID$(M2$,MN*2+1,2): MN=
MN+30: GOTO 2370
2330 MN=INSTR(TH$,MID$(L$(RW),ZC
,5)): IF MN=0 THEN GOTO 2350
2340 ML$=MID$(M3$,((MN-1)/5)*4+1
,4): MN=(MN-1)/5 + 104: GOTO 237
0
2350 MN=INSTR(PS$,MID$(L$(RW),ZC
,5)): IF MN=0 THEN ZE=3: GOTO 33
30 ELSE                MN=((MN-1)/
5)+112
2360 '***NOW FIND OPERAND TYPE**
*
2370 EA=99999: NV=99999: DI=9999
9: ST$=""
2380 ZC=ZC+6
2390 'FIRST LOOK FOR $XXXX - EXT
ENDED ADDRESSING - MUST BE HEX
2400 IF MID$(L$(RW),ZC,1)="$" TH
EN EA=VAL("&H"+MID$(L$(RW),ZC+1,
4)): IF EA=0          THEN ZE=4:
GOTO 3330 ELSE GOTO 2610
2410 'LOOK FOR #$XXXX - IMMEDIAT
E TWO OR FOUR DIGIT HEX
2420 IF MID$(L$(RW),ZC,2)="#$" T
HEN NV=VAL("&H"+MID$(L$(RW),ZC+2
,4) ): GOTO 2610
```


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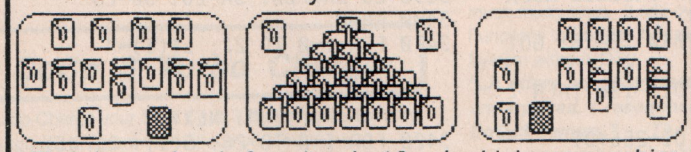

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```
2430 'LOOK FOR #XXXXX - IMMEDIAT
E DECIMAL
2440 IF MID$(L$(RW),ZC,1)="#" TH
EN NV=VAL(MID$(L$(RW),ZC+1,5) ):
 GOTO 2610
2450 'LOOK FOR + OR - WITH XXX,R
2460 IF (MID$(L$(RW),ZC,1)<>"-"
AND MID$(L$(RW),ZC,1)<>"+") THEN
 GOTO 2500
2470 ZS$=MID$(L$(RW),ZC+4,2): IF
 (ZS$<>",Y" AND ZS$<>",X" AND ZS
$<>",U" AND          ZS$<>",S")
THEN ZE=5: GOTO 3330
2480 IF ZS$=",X" THEN ZT$="88" E
LSE IF ZS$=",Y" THEN ZT$="A8" EL
SE IF ZS$=",U"       THEN ZT$="C
8" ELSE ZT$="E8"
2490 DI=VAL(MID$(L$(RW),ZC,4)):
GOTO 2610
2500 IF MN<112 THEN GOTO 2560
2510 IF MN<>113 THEN GOTO 2540
2520 FOR I=ZC TO ZC+15: IF MID$(
L$(RW),I,1)="#" THEN GOTO 2530 E
LSE ST$=ST$ +        MID$(L$(RW)
,I,1): NEXT
2530 GOTO 2610
2540 IF MID$(L$(RW),ZC+5,1)<>" "
 THEN ZE=5: GOTO 3330 ELSE NV=VA
L(MID$(L$(RW),ZC,5)): GOTO 2610
2550 'MUST BE SYMBOLIC ADDRESS H
ERE
2560 IF MID$(L$(RW),ZC+1,1)<>" "
 THEN ZE=5: GOTO 3330
2570 SY=ASC(MID$(L$(RW),ZC,1)) -
 65
2580 IF (SY<0 OR SY>25) THEN ZE=
5: GOTO 3330
2590 IF S(SY)<>-1 THEN EA=S(SY):
 GOTO 2610 ELSE IF PN=1 THEN ZE=
1: GOTO 3330
2600 IF CP>53 THEN HPRINT (53,RW
),"#": EA=0 ELSE HPRINT (13,RW),
"#": EA=0
2610 '***NOW HAVE VALID MNEMONIC
 AND ARGUMENT, CONSTRUCT MACHINE
 LANGUAGE***
2620 IF CP>39 THEN ZC=40 ELSE ZC
=0
2630 IF MN>29 THEN GOTO 2770
2640 LI=1
2650 IF CP>39 THEN IF RW+22<LR T
HEN IF PN=0 THEN GOSUB 3530: GOT
O 2700
2660 IF CP<=39 THEN IF RW<LR THE
N IF PN=0 THEN GOSUB 3530: GOTO
2700
2670 IF PN=0 THEN GOTO 2700
2680 HPRINT (ZC,RW),RIGHT$("0000
"+HEX$(LO),4)+" "+ML$
2690 FOR I=0 TO LEN(ML$)/2-1: PO
KE LO+I, VAL("&H"+MID$(ML$,I*2+1
,2)): NEXT
2700 IF SB>LO THEN SB=LO
2710 LO=LO+LI
2720 EB=LO-1
2730 IF CP>39 THEN IF RW+22>LR T
HEN LR=RW+22
2740 IF CP<=39 THEN IF RW>LR THE
N LR=RW
2750 RETURN
2760 'FIRST CHECK FOR RELATIVE A
DDRESSING
2770 IF MN>111 THEN GOTO 3170
2780 AM$=MID$(AA$,MN+1,1)
2790 IF AM$<>"A" THEN GOTO 2880
2800 IF MN=56 THEN ML$="16": LI=
3: GOTO 2830
2810 IF MN=58 THEN ML$="17": LI=
3: GOTO 2830
2820 ML$="10"+ML$: LI=4
2830 EA=EA-LO-LI: IF EA<0 THEN S
G=1: EA=ABS(EA) ELSE SG=0
2840 E1=INT(EA/256): E2=EA-(E1*2
56)
2850 IF SG=1 THEN E2=256-E2: E1=
255-E1: IF E2=256 THEN E2=0: E1=
E1+1
2860 ML$=ML$+RIGHT$("00"+HEX$(E1
),2)+RIGHT$("00"+HEX$(E2),2)
2870 GOTO 2650
2880 'NOW CHECK FOR IMMEDIATE AD
DRESSING
2890 IF NV=99999 THEN GOTO 2950
2900 AM=ASC(AM$)-&H40
2910 IF (AM AND 4)<>4 THEN ZE=4:
 GOTO 3330
2920 IF (AM AND 16)<>16 THEN ML$
=ML$+RIGHT$("00"+HEX$(NV),2) ELS
E                    ML$=ML$+RIG
HT$("0000"+HEX$(NV),4)
2930 LI=LEN(ML$)/2: GOTO 2650
2940 ML$=ML$+RIGHT$("0000"+HEX$(
NV),4): LI=3: GOTO 2650
2950 'NOW CHECK FOR EXTENDED ADD
RESSING
2960 IF EA=99999 THEN GOTO 3030
2970 AM=ASC(AM$)-&H40
2980 IF (AM AND 8)<>8 THEN ZE=4:
 GOTO 3330
2990 IF LEN(ML$)=4 THEN MM$=LEFT
$(ML$,2) ELSE MM$=""
3000 IF LEN(ML$)=4 THEN MS$=RIGH
T$(ML$,2) ELSE MS$=ML$
3010 ML$=MM$+RIGHT$("00"+HEX$(VA
L("&H"+MS$)+48),2)+RIGHT$("0000"
 + HEX$(EA),4)
3020 LI=LEN(ML$)/2: GOTO 2650
3030 'NOW CHECK FOR INDEXED ADDR
ESSING
3040 IF DI=99999 THEN ZE=10: GOT
O 3330
3050 IF DI>127 OR DI<-128 THEN Z
E=11: GOTO 3330
3060 IF DI<0 THEN DI=256+DI
3070 AM=ASC(AM$)-&H40
3080 IF (AM AND 2)<>2 THEN ZE=10
: GOTO 3330
3090 IF LEN(ML$)=4 THEN MM$=LEFT
$(ML$,2) ELSE MM$=""
3100 IF LEN(ML$)=4 THEN MS$=RIGH
T$(ML$,2) ELSE MS$=ML$
3110 ML$=MM$+RIGHT$("00"+HEX$(VA
L("&H"+MS$)+32),2)+ZT$+RIGHT$("0
000"+                HEX$(DI),2)
: LI=LEN(ML$)/2: GOTO 2650
3120 GOTO 2650
3130 'CHECK FOR OP-CODE FCB OR G
REATER
3140 IF EA<>99999 THEN ML$=LEFT$
(ML$,2)+RIGHT$("00"+HEX$(VAL("&H
"+MID$(ML$,3,2))     +48),2)+ RI
GHT$("0000"+HEX$(EA),4): LI=4: G
OTO 2670
3150 IF NV<>99999 THEN IF NV>655
35 THEN ZE=6: GOTO 3330
3160 IF NV<>99999 THEN ML$=ML$+R
IGHT$("0000"+HEX$(NV),4): LI=4:
GOTO 2670
3170 'CHECK FOR FCB
3180 IF MN=112 THEN IF ( NV=9999
9 OR NV>255 ) THEN ZE=6: GOTO 33
30 ELSE              ML$=RIGHT$
("00"+HEX$(NV),2):LI=1: GOTO 267
0
3190 'CHECK FOR FCC
3200 IF MN=113 THEN ML$=CHR$(34)
+LEFT$(ST$,6)+CHR$(34): LI=LEN(S
T$): GOTO 2670
3210 'CHECK FOR FDB
3220 IF MN=114 THEN IF NV>65535
THEN ZE=6: GOTO 3330 ELSE ML$=RI
GHT$("0000"+HEX$     (NV),4): LI
=2: GOTO 2670
3230 'CHECK FOR ORG
3240 IF MN>115 THEN IF EA=99999
THEN ZE=6: GOTO 3330
3250 LO=EA: ML$="": LI=0: GOTO 2
670
3260 '*************************
*********************************
**
3270 '                        UTILI
TY SUBROUTINES
3280 '*************************
*********************************
**
3290 '***SUBROUTINE TO CLEAR CUR
RENT CHARACTER POSITION AND STOR
E CHAR***
3300 HLINE (CP*8,RW*8)-(CP*8+7,R
W*8+7),PRESET,BF
3310 MID$(L$(RW),CP+1,1)=ZA$
3320 RETURN
3330 '***ERROR PROCESSING FOR LI
NE***
3340 IF CP>53 THEN ZC=53 ELSE ZC
=13
3350 HLINE (ZC*8,RW*8)-(ZC*8+7,R
W*8+7),PRESET,BF
3360 HPRINT (ZC,RW),"*"
3370 RETURN
3380 '***CLEAR EVERYTHING SUBROU
TINE***
3390 LO=&H7F00: SA=LO: SB=LO
3400 PN=0
3410 FOR I=0 TO 22: L$(I)="

  "+A$+"
                ": NEXT
3420 FOR I=0 TO 26: S(I)=-1: NEX
T
3430 GOSUB 3510
3440 HCLS
3450 CP=14: RW=0
3460 A$=CHR$(124)
3470 FOR Y=0 TO 22: HPRINT (0,Y)
,"              . ..... ..... .
.........                . .....
..... .....": NEXT
3480 FOR Y=0 TO 22: HPRINT (39,Y
),A$: NEXT
3490 GOSUB 3570
3500 RETURN
3510 '***CLEAR BINARY DATA AND S
CREEN***
3520 FOR I=0 TO 26: S(I)=-1: NEX
T
3530 FOR I=0 TO 22: HPUT(0,I*8)-
(103,I*8+7),1,PSET: NEXT
3540 FOR I=0 TO 22: HPUT(320,I*8
)-(423,I*8+7),1,PSET: NEXT
3550 RETURN
3560 '***PRINT TITLE***
3570 HPRINT (0,24),"BARDEN'S EZA
SM: F1 SAVES/F2 LOADS/CLEAR/SHFT
,UP ARR DELETES/SHFT,DN ARR INSE
RTS"
3580 RETURN
```

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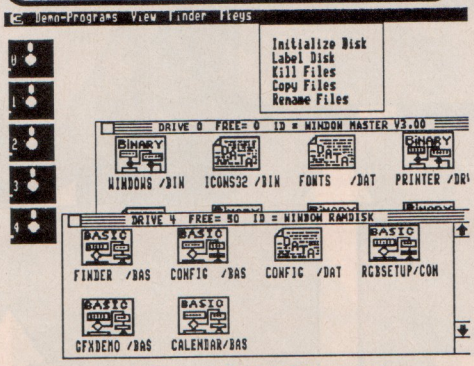

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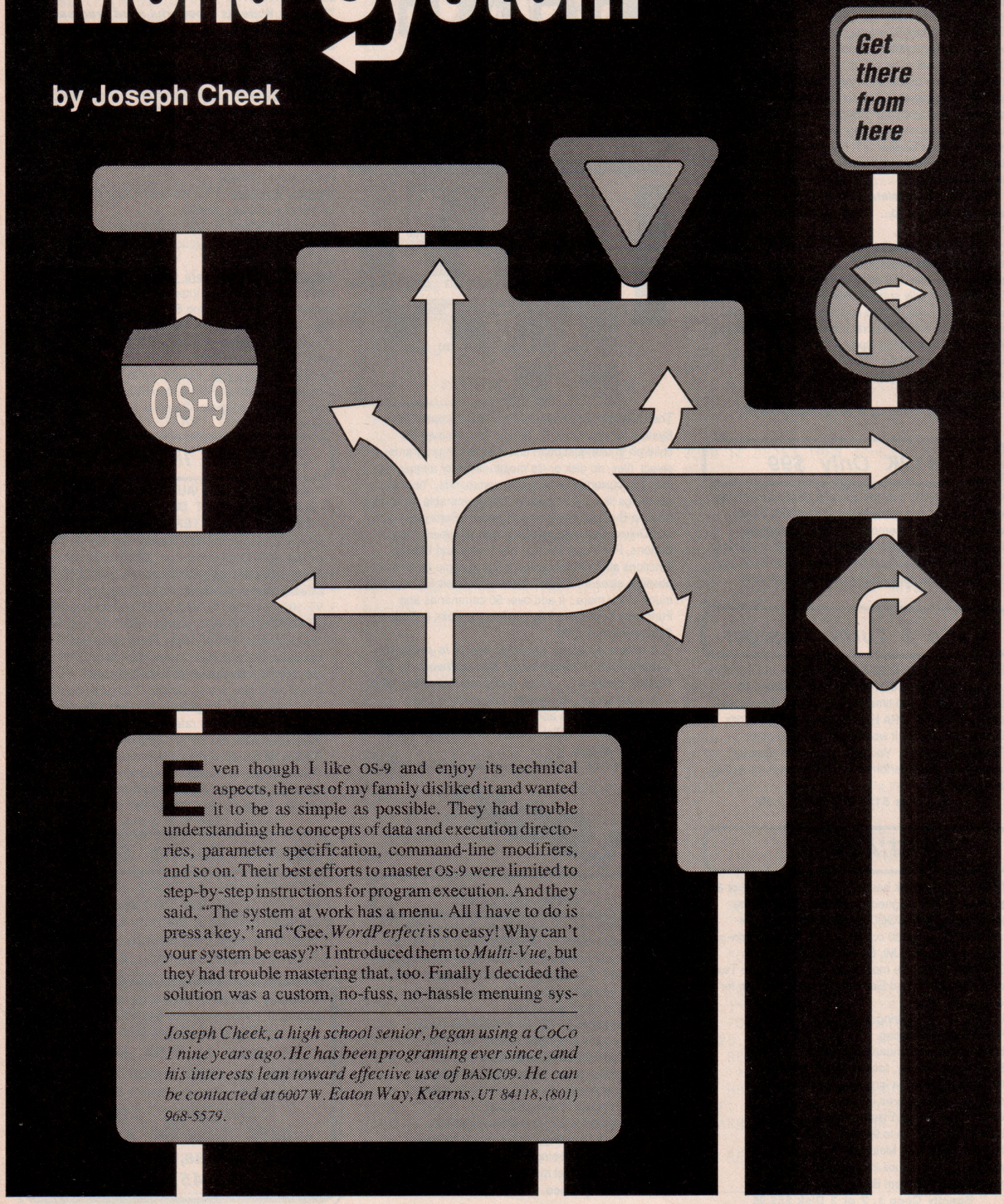
Menu System

by Joseph Cheek



Even though I like OS-9 and enjoy its technical aspects, the rest of my family disliked it and wanted it to be as simple as possible. They had trouble understanding the concepts of data and execution directories, parameter specification, command-line modifiers, and so on. Their best efforts to master OS-9 were limited to step-by-step instructions for program execution. And they said, "The system at work has a menu. All I have to do is press a key," and "Gee, *WordPerfect* is so easy! Why can't your system be easy?" I introduced them to *Multi-Vue*, but they had trouble mastering that, too. Finally I decided the solution was a custom, no-fuss, no-hassle menuing sys-

---

Joseph Cheek, a high school senior, began using a CoCo 1 nine years ago. He has been programing ever since, and his interests lean toward effective use of BASIC09. He can be contacted at 6007 W. Eaton Way, Kearns, UT 84118, (801) 968-5579.

tem that would appear when they turned the computer on (almost). *MS*, my menuing system, was born.

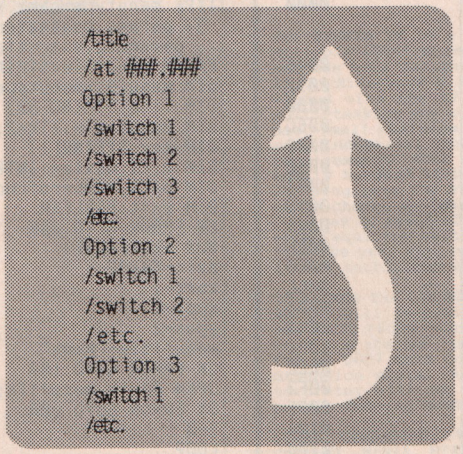
MS is easy to use. Press a key and a menu appears. Another key press and a program executes. No fuss, no hassle, and all programs can be run from it. The menuing system is easy to set up and modify, and it does not rely on the directory system for its structure. Programs can be password-protected, and the system can be set to prompt the user for necessary parameters.

To use *MS*, enter Listing 1 and pack it with

```
pack* /dd/cmds/ms
```

Exit BASIC09 and create a directory called `/dd/SYS/MENUS`. Fire up a word processor and enter Listing 2, which is a sample menu file. Save it in the `/dd/sys/menus` directory under the name `main.mnu`. From the command prompt, type `ms #16K` and watch the menu come up.

You now have a working menu system. However, you cannot do much with it until you learn how to create your own menus. Menus are created from information in text files stored in the `/dd/sys/menus` directory. The initial menu is always the file named `main.mnu`. The general format of a menu file is as follows:



32-by-16	(VDG, supported with `/v1` only)
40-by-24	(40-by-24 text window)
80-by-24	(80-by-24 text window)
640-by-192-by-2	(640-by-192, two-color graphics window)
320-by-192-by-4	(320-by-192, four-color graphics window)
640-by-192-by-4	(640-by-192, four-color graphics window)
320-by-192-by-16	(320-by-192, 16-color graphics window)

Figure 1: Screen Types for the `/screen` Switch

Every piece of menu information in the file is stored on a line-by-line basis, one piece per line. Every line has a slash as the first character, except for the actual menu options. In other words, lines beginning with a slash are considered *MS* commands. Lines without slashes are printed onscreen as options the user can select. The first line has the `/title` switch. This line specifies the menu title. The second line has the `/at` switch indicating to *MS* the upper-left coordinates where the menu should appear on the screen. These two switches affect the entire menu, all other switches affect only the menu option directly preceding them.

Study Listing 2 carefully. To build your own menu, decide on a name for the menu,

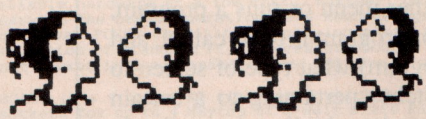
OS-9 Level II

Listing 1: `ms.b09`

```
PROCEDURE ms
 0000       CHD "/dd/sys/menus"
 0011       LOOP
 0013         RUN gfx2("dwend")
 0020         RUN gfx2("dwset",2,0,0,80,24,0,1,2)
 0045         RUN gfx2("curoff")
 0053         RUN gfx2("palette",0,63)
 0068         RUN gfx2("color",5,4)
 007B         RUN gfx2("erline")
 0089         PRINT " MS-Menuing System v1.0";
 00A6         PRINT "                       ";
 00C3         PRINT "Written by Joseph Cheek for CSS"
 00E6         RUN gfx2("curxy",0,23)
 00F9         RUN gfx2("erline")
 0107         PRINT " Break or / = previous menu";
 0127         PRINT "                          ";
 013C         PRINT "Arrow keys + ENTER or number selects";
 0165         RUN gfx2("color",0,1)
 0178         RUN domenu("main.mnu")
 0188       ENDLOOP

PROCEDURE toupper
 0000       PARAM text:STRING[255]
 000C       DIM work:STRING[255]
 0018       DIM ltr:STRING[1]
 0024       DIM c:INTEGER
 002B       work=""
 0032       FOR c=1 TO LEN(text)
 0044         ltr=MID$(text,c,1)
 0052         IF ltr>="a" AND ltr<="z" THEN
 0067           ltr=CHR$(ASC(ltr)-32)
 0074         ENDIF
 0076         work=work+ltr
 0082       NEXT c
 008D       text=work
 0095       END

PROCEDURE eko
 0000       PARAM echoon:BOOLEAN
 0007     TYPE optsec=res1:STRING[4]; echo:BYTE; res2:STRING[27]
```

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where you want it to appear on the screen, and which options it will have. A single menu can contain up to nine options.

The switches tell *MS* all it needs to know about their associated options. For example, they tell *MS* whether a given menu option calls up another menu or runs a program, what menu or program is to be called, and (if it is a program) what type of screen to use. All switches pertaining to a certain option are found on the lines immediately following that option, until another option is encountered. So, to make a menu option, have a line in the menu file with the name of the option on it. List all the switches for that option, one to a line. Follow this in a similar manner with the remaining menu options.

Menu Switches

Here is a list of all the switches *MS* supports, what they mean, and how to use them:

`/exec` — The `/exec` switch specifies the program to run. For example, `/exec mvcanvas` causes *MVCanvas* to execute.

`/type` — The `/type` switch specifies whether the particular option is used to select another menu, execute a program, or quit the menu system. If no `/type` switch is used, *MS* assumes the option calls a program. Example: `/type menu` or `/type quit`.

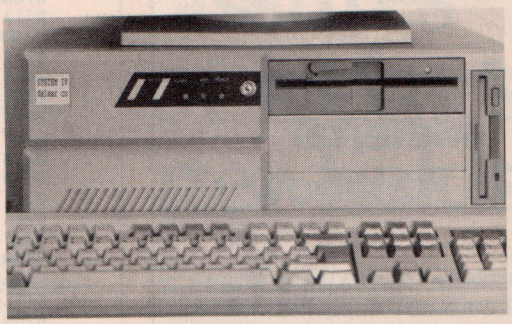
`/pause` — This switch tells the system to wait for the user to press a key before the menu is returned. When used, the current screen remains viewable until the user is ready to continue. Example: `/pause`.

```
0028      TYPE Regs=cc,a,b,dp:BYTE; x,y,u:INTEGER
004D      DIM ops:optsec
0056      DIM r:Regs
005F      DIM CCode:BYTE
0066      CCode=$8D
006E      r.a=0
0079      r.b=$00
0085      r.x=ADDR(ops)
0093      RUN syscall(CCode,r)
00A2      IF echoon THEN
00AB        ops.echo=1
00B6      ELSE
00BA        ops.echo=0
00C5      ENDIF
00C7      CCode=$8E
00CF      RUN syscall(CCode,r)
00DE      END

PROCEDURE domenu
0000      TYPE menutype=name,password:STRING[25]; choicetype:STRING[1
           ]; params,pauseatend,chainto:BOOLEAN; screentype:BYTE
           ; parammsg,execution,directory:STRING[50]
0046      PARAM menufile:STRING[80]
0052      DIM menu(9):menutype
0060      DIM line:STRING[80]
006C      DIM menutitle,line2:STRING[25]
007C      DIM key:STRING[1]
0088      DIM c,c1,maxlen:INTEGER
0097      DIM path,numberofchoices,xpos,ypos,errnum,curc:BYTE
00B2      DIM exit:BOOLEAN
00B9      ON ERROR GOTO 200
00BF      RUN eko(FALSE)
00C6      exit=FALSE
00CC      curc=1
00D3      xpos=2
00DA      ypos=2
00E1      menutitle="Menu"
00EC      ON ERROR GOTO 100
00F2      OPEN #path,menufile:READ
00FE      ON ERROR GOTO 200
0104      c=0
010B      LOOP
010D        REPEAT
010F        EXITIF EOF(#path) THEN
0119          exit=TRUE
011F        ENDEXIT
0123          READ #path,line
012D        UNTIL line<>"" AND ASC(line)<>35
0140      EXITIF exit THEN
0149      ENDEXIT
014D        IF ASC(line)=47 THEN
015A          line=RIGHT$(line,LEN(line)-1)
016A          IF SUBSTR(" ",line)=0 THEN
017A            line2=line
0182          ELSE
0186            line2=LEFT$(line,SUBSTR(" ",line)-1)
0199          ENDIF
019B          RUN toupper(line2)
01A5          line=RIGHT$(line,LEN(line)-LEN(line2)-1)
01BA          IF line2="TITLE" THEN
01CB            menutitle=line
01D3          ENDIF
01D5          IF line2="AT" THEN
01E3            xpos=VAL(LEFT$(line,SUBSTR(",",line)-1))
01F8            ypos=VAL(RIGHT$(line,LEN(line)-SUBSTR(",",line)))
020F          ENDIF
0211          IF line2="PASSWORD" THEN
0225            menu(c).password=line
0234            RUN toupper(menu(c).password)
0244          ENDIF
0246          IF line2="PARAMS" THEN
0258            menu(c).params=TRUE
0265            menu(c).parammsg=line
0274          ENDIF
0276          IF line2="CD" THEN
0284            menu(c).directory=line
0293          ENDIF
0295          IF line2="SCREEN" THEN
02A7            IF LEFT$(line,2)="80" THEN
02B8              menu(c).screentype=2
02C6            ENDIF
02C8            IF LEFT$(line,2)="40" THEN
02D9              menu(c).screentype=1
02E7            ENDIF
02E9            IF LEFT$(line,2)="32" THEN
02FA              menu(c).screentype=9
0308            ENDIF
030A            IF LEFT$(line,3)="640" AND RIGHT$(line,1)="2" THEN
0327              menu(c).screentype=5
0335            ENDIF
```

```
0337          IF LEFT$(line,3)="320" AND RIGHT$(line,1)="4"
 THEN
0354              menu(c).screentype=6
0362            ENDIF
0364          IF LEFT$(line,3)="640" AND RIGHT$(line,1)="4"
 THEN
0381              menu(c).screentype=7
038F            ENDIF
0391        IF LEFT$(line,3)="320" AND RIGHT$(line,2)="16"
 THEN
03AF              menu(c).screentype=8
03BD            ENDIF
03BF          ENDIF
03C1          IF line2="PAUSE" THEN
03D2            menu(c).pauseatend=TRUE
03DF          ENDIF
03E1          IF line2="TYPE" THEN
03F1            RUN toupper(line)
03FB            menu(c).choicetype=line
040A            RUN toupper(menu(c).choicetype)
041A          ENDIF
041C          IF line2="EXEC" THEN
042C            menu(c).execution=line
043B          ENDIF
043D          IF line2="NOCHAIN" THEN
0450            menu(c).chainto=FALSE
045D          ENDIF
045F        ELSE
0463          c=c+1
046E        EXITIF c>9 THEN
047A        ENDEXIT
047E          menu(c).name=line
048D          menu(c).choicetype=""
049B          menu(c).password=""
04A9          menu(c).pauseatend=FALSE
04B6          menu(c).params=FALSE
04C3          menu(c).chainto=TRUE
04D0          menu(c).screentype=2
04DE          menu(c).parammsg=""
04EC          menu(c).execution=""
04FA          menu(c).directory=""
0508        ENDIF
050A      ENDLOOP
050E      CLOSE #path
0514      numberofchoices=c
051C      maxlen=LEN(menutitle)-5
0528      FOR c=1 TO numberofchoices
0539        IF maxlen<LEN(menu(c).name) THEN
054D          maxlen=LEN(menu(c).name)
055C        ENDIF
055E      NEXT c
0569      RUN gfx2("owset",1,xpos,ypos,maxlen+9,numbe
rofchoices+4,1,3)
0597      PRINT " "; menutitle
05A0      PRINT
05A2      FOR c=1 TO numberofchoices
05B3        IF menu(c).choicetype="M" THEN
05C6          PRINT "*"
05CB        ELSE IF menu(c).choicetype="" THEN
05E0            PRINT ">"
05E5          ELSE
05E9            PRINT
05EB          ENDIF
05ED        ENDIF
05EF      NEXT c
05FA      RUN gfx2("cwarea",1,1,maxlen+7,numberofchoic
es+2)
061C      RUN gfx2("color",0,1)
062F      RUN gfx2("clear")
063C      PRINT
063E      FOR c=1 TO numberofchoices
064F        PRINT "  "; c; ". "; menu(c).name
0668      NEXT c
0673      GOSUB 1010
0677 10   LOOP
067C        GET #0,key
0685        IF key=CHR$(12) THEN
0692          GOSUB 1000
0696          curc=curc-1
06A1          IF curc=0 THEN
06AD            curc=numberofchoices
06B5          ENDIF
06B7          GOSUB 1010
06BB        ENDIF
06BD        IF key=CHR$(10) THEN
06CA          GOSUB 1000
06CE          curc=curc+1
06D9          IF curc>numberofchoices THEN
06E6            curc=1
06ED          ENDIF
```


SYSTEM IV COMPUTER



THE **SYSTEM IV** is a high performance computer system based on the Motorola 68000 microprocessor operating at a clock speed of 16 MHz and has been designed to provide maximum flexibility and versatility. Microware's Professional OS9/68000 operating system is included with the **SYSTEM IV** providing an efficient multi-user and multi-tasking environment. This provides the user with a PC for home use, small business applications and a viable low-cost solution for many industrial control applications (embedded systems). Special requirements (such as midi, sound, A-D/D-A, net-working, etc.) are easily handled with readily available low-cost PC/XT boards which can plug into the **SYSTEM IV** expansion slots. And, as user requirements change or improved special function boards become available, they may be added or replaced at the user's option. Thus, when software requiring multi-media or other new capability becomes a reality, the user will be able to add that capability easily and have the latest technology at his disposal.

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OTHER OPERATING SYSTEMS may be installed. These include CPM, UNIFLEX, MINIX, STARDOS, REXDOS and most any other operating system capable of running on the 68000 microprocessor chip.

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COMPENSATION: We do pay for submissions, based on a number of criteria. Those wishing remuneration should *so state* when making submissions.

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Please do not submit material currently submitted to another publication.

```
06EF            GOSUB 1010
06F3          ENDIF
06F5          IF key="/" OR key=CHR$(8) THEN
070A 20         RUN gfx2("owend")
071A            END
071C          ENDIF
071E          IF key=CHR$(13) OR key=CHR$(9) THEN
0733            GOSUB 1020
0737          ENDIF
0739          IF key>="1" AND key<=STR$(numberofchoices) THEN
074F            GOSUB 1000
0753            curc=VAL(key)
075D            GOSUB 1010
0761            GOSUB 1020
0765          ENDIF
0767        ENDLOOP
076B 100    RUN gfx2("bell")
077A        END
077C 200    errnum=ERR
0785        IF errnum=2 OR errnum=3 OR errnum=211 THEN
079F          GOTO 20
07A3        ENDIF
07A5        RUN gfx2("owset",1,30,8,20,7,1,3)
07C7        RUN gfx2("cwarea",1,1,18,5)
07E1        RUN gfx2("color",0,1)
07F4        RUN gfx2("clear")
0801        PRINT " OS9 Error #"; errnum
0815        PRINT
0817        PRINT "  Press any key"
082A        GET #0,key
0833        RUN gfx2("owend")
0840        GOTO 10
0844        PRINT #2,"OS9 Error #"; errnum
085B        END
085D 1000   RUN gfx2("curxy",2,curc)
0875        RUN gfx2("color",0,1)
0888        PRINT curc; ". "; menu(curc).name
089C        RETURN
089E 1010   RUN gfx2("curxy",2,curc)
08B6        RUN gfx2("color",5,2)
08C9        PRINT curc; ". "; menu(curc).name
08DD        RETURN
08DF 1020   IF menu(curc).password<>"" THEN
08F4          RUN gfx2("owset",1,7,8,66,7,1,5)
0916          RUN gfx2("cwarea",1,1,64,5)
0930          RUN gfx2("color",0,1)
0943          RUN gfx2("clear")
0950          PRINT
0952          PRINT
0954          PRINT "  Password: ";
0965          RUN gfx2("curon")
0972          READ #0,line
097B          RUN gfx2("curoff")
0989          RUN toupper(line)
0993          RUN gfx2("owend")
09A0          IF line<>menu(curc).password THEN
09B3            RETURN
09B5          ENDIF
09B7        ENDIF
09B9        IF menu(curc).choicetype="M" THEN
09CC          RUN domenu(menu(curc).execution+".mnu")
09E2        ENDIF
09E4        IF menu(curc).choicetype="Q" THEN
09F7          RUN gfx2("owset",1,28,8,24,5,1,3)
0A19          PRINT " Exit MS"
0A25          RUN gfx2("cwarea",1,1,22,3)
0A3F          RUN gfx2("color",0,1)
0A52          RUN gfx2("clear")
0A5F          PRINT
0A61          PRINT " Are you sure [Y/n]?";
0A7A          GET #0,key
0A83          RUN toupper(key)
0A8D          IF key<>"N" THEN
0A9A            RUN gfx2("dwend")
0AA7            RUN gfx2("dwset",2,0,0,80,24,0,1,2)
0ACC            RUN gfx2("palette",0,63)
0AE1            RUN eko(TRUE)
0AE8            RUN gfx2("curon")
0AF5            STOP
0AF7          ELSE
0AFB            RUN gfx2("owend")
0B08          ENDIF
0B0A        ENDIF
0B0C        IF menu(curc).directory<>"" THEN
0B1E          CHD menu(curc).directory
0B29        ENDIF
0B2B        IF menu(curc).choicetype="" THEN
0B3D          IF menu(curc).params THEN
0B4C            RUN gfx2("owset",1,10,8,60,7,1,3)
0B6E            RUN gfx2("cwarea",1,1,58,5)
```

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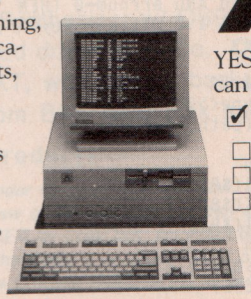

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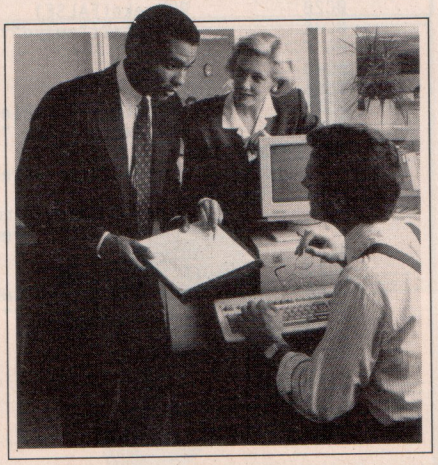

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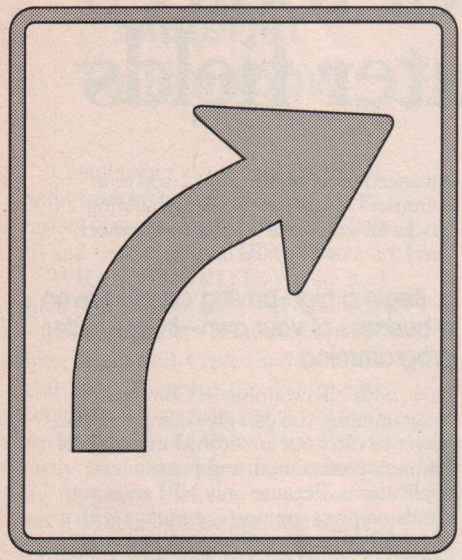
/params — If this switch is used, the user is asked to enter parameters for the program. If any text is found after the /params switch in the menu file, it is displayed when the parameters are requested. Examples: /params, or /params enter filename to edit.



/password — Programs may be password-protected with this switch. The user must type the password correctly to proceed. Example: /password coco3.

/screen — This specifies the type of screen to be used when executing a program. Possible screen types are shown in Figure 1. If your system has a /v1 window descriptor, the 32-by-16 screen type is supported. If no /screen switch is used, an 80-by-24 screen size is assumed. Examples: /screen 80-by-24, /screen 40-by-24 and /screen 32-by-16.

/cd — The /cd switch is used to specify a new directory in the event the software requires it (some software must be run from specific directories, or perhaps you already have your programs set up to run from specific directories). Example: /cd /dd/mydir.

/nochain — The /nochain switch is used to tell *MS* not to have the shell chain to the specified program, but instead just fork (run) it. Normally, the shell is called to chain to a program by using the ex command because this saves memory. Sometimes, however, this is not possible or not wise, and using this switch disables the chaining feature for the particular program. Example: /nochain.

Menu Considerations

Make sure the menu has room to fit on the screen. Using a menu that does not fit causes *MS* to crash. If necessary, move it to the left or higher on the screen.

When setting up a menu, the name of the menu becomes the /exec parameter, but

```
ØB88            RUN gfx2("color",Ø,1)
ØB9B            RUN gfx2("clear")
ØBA8            PRINT
ØBAA            IF menu(curc).parammsg="" THEN
ØBBC              PRINT " Enter Parameters:"
ØBD2            ELSE
ØBD6              PRINT " "; menu(curc).parammsg; ":"
ØBE9            ENDIF
ØBEB            PRINT
ØBED            PRINT " ";
ØBF4            RUN eko(TRUE)
ØBFB            RUN gfx2("curon")
ØC08            READ #Ø,line
ØC11            RUN gfx2("curoff")
ØC1F            line=" "+line
ØC2B            RUN eko(FALSE)
ØC32            RUN gfx2("owend")
ØC3F          ELSE
ØC43            line=""
ØC4A          ENDIF
ØC4C          IF menu(curc).chainto THEN
ØC5B            RUN execute("ex "+menu(curc).execution+line,menu(cu
rc).pauseatend
                  ,menu(curc).screentype)
ØC8A          ELSE
ØC8E           RUN execute(menu(curc).execution+line,menu(curc).pauseatend
                 ,menu(curc).screentype)
ØCB7          ENDIF
ØCB9        ENDIF
ØCBB        IF menu(curc).directory<>"" THEN
ØCCD          CHD "/dd/sys/menus"
ØCDE        ENDIF
ØCEØ        RETURN

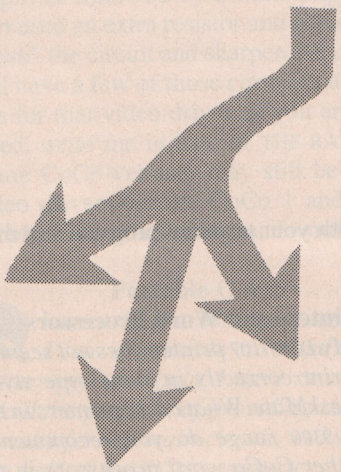
PROCEDURE help
 0000       RUN gfx2("curon")
 000D       RUN eko(TRUE)

PROCEDURE execute
 0000       TYPE regs=cc,a,b,dp:BYTE; x,y,u:INTEGER
 0025       PARAM execstr:STRING[80]; pauseatend:BOOLEAN
 0037       PARAM screentype:BYTE
 003E       DIM r:regs
 0047       DIM key:STRING[1]
 0053       DIM path,oldpath,errnum,xmax:BYTE
 0066       errnum=Ø
 006D       IF screentype=9 THEN
 0079         OPEN #path,"/v1":UPDATE
 0087       ELSE
 008B         OPEN #path,"/w":UPDATE
 0098         IF screentype=1 OR screentype=6 OR screentype=8 THEN
 00B2           xmax=4Ø
 00B9         ENDIF
 00BB         IF screentype=2 OR screentype=5 OR screentype=7 THEN
 00D5           xmax=8Ø
 00DC         ENDIF
 00DE         RUN gfx2(path,"dwset",screentype,Ø,Ø,xmax,24,Ø,1,2)
 010C         RUN gfx2(path,"palette",Ø,63)
 0126       ENDIF
 0128       xmax=Ø
 012F       PUT #path,xmax
 0139       RUN gfx2(path,"select")
 014C       r.a=Ø
 0157       RUN syscall($82,r)
 0165       oldpath=r.a
 017Ø       CLOSE #Ø,#1,#2
 017D       r.a=path
 0189       RUN syscall($82,r)
 0197       RUN syscall($82,r)
 01A5       RUN syscall($82,r)
 01B3       ON ERROR GOTO 1Ø
 01B9       SHELL execstr
 01BE 1Ø    errnum=ERR
 01C7       ON ERROR
 01CA       RUN gfx2("curoff")
 01D8       IF pauseatend AND errnum=Ø THEN
 01E8         PRINT "<-MS 1.Ø-Hit any key->";
 0206         GET #Ø,key
 020F       ENDIF
 0211       CLOSE #Ø,#1,#2
 021E       IF screentype<>9 THEN
 022A         RUN gfx2(path,"dwend")
 023C       ENDIF
 023E       r.a=oldpath
 024A       RUN syscall($82,r)
 0258       RUN syscall($82,r)
 0266       RUN syscall($82,r)
 0274       CLOSE #path
 027A       RUN gfx2("select")
 0288       RUN eko(FALSE)
```

```
028F        IF errnum<>0 THEN
029B          RUN gfx2("owset",1,30,8,20,7,1,3)
02BD          RUN gfx2("cwarea",1,1,18,5)
02D7          RUN gfx2("color",0,1)
02EA          RUN gfx2("clear")
02F7          PRINT
02F9          PRINT " OS9 Error #"; errnum
030D          PRINT
030F          PRINT "  Press any key";
0323          GET #0,key
032C          RUN gfx2("owend")
0339        ENDIF
033B        END
```

Listing 2: `main.mnu`

```
/title Main Menu
/at 2,2
Applications
/exec apps
/type menu
Games
/exec games
/type menu
System Utilities
/exec sutils
/type menu
Shell
/exec shell
Quit
/type quit
```



the `.mnu` extension should *not* be included. For example,

```
My Personal Menu
/exec mymenu
/type menu
```

uses the menu in the file `mymenu.mnu` when the My Personal Menu option is chosen.

To select an option, press its number, or use the up and down arrow keys to move the highlight bar over the choice and press ENTER. To move back a level (to the previous menu), press BREAK (or SHIFT-BREAK or CTRL-BREAK) or the slash key. The right arrow also serves as an ENTER key, and the left arrow functions as a slash.

MS also supports password protection for menus and the `/type quit` switch.

MS should be run with at least 16K. Using 8K, the default, allows it to have only a few menus on the screen at one time.

To have *MS* execute automatically on boot-up, place the following line at the end of your `startup` file: `ms #16K`. Or, use `cmdgen` to create the following script: `runb ms #16K`. Call the script `autoexec` and place it in your execution directory.

I hope you enjoy *MS*, and that it will help your family, too, better appreciate the power of your CoCo.

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News About Upcoming Products...

We've got a lot of new products under development right now, both for the Color Computer 3 and for the new OS9-68000 machines. A few of the products you can expect to see over the next few months are a DIALOG BOX MANAGER for OS9/OSK; the PIXELBOX adapter that lets you use LogiTech ScanMan handheld scanners with the CoCo 3, and OSK ports of several popular Burke & Burke utility packages. Stop by our booth at the Chicago Rainbowfest for the latest news! -- Chris Burke

New!

CyberVoice speaks well for OS9!

We've mated a high-tech SC-02 speech synthesizer with an entirely new kind of OS9 device driver that actually lets you specify your own pronunciation rules. You can even use escape sequences to control the style and pitch of the voice - male, female, high, low, fast, slow - billions of combinations. Advanced features like instantaneous inflection control produce high-quality speech! CyberVoice is compatible with the Speech Systems SuperVoice - buy H/W & S/W, or just the CyberVoice software.

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Modem Upgrades

by Marty Goodman
Contributing Editor

Q *Can I convert a 300-bps DC Modem Pak to operate at 1200 or 2400 bps by some simple operation, such as replacing the crystal connected to the 74HC943 modem chip?*

Dale Wardell (NITOR)
Millinocket, Massachusetts

A No, you cannot. Speed is not the only difference between 300-, 1200- and 2400-bps modem circuits — the entire method of encoding data is different. It is simply impossible to turn any 300-bps modem into a 1200- or 2400-bps modem by any means short of literally building an entirely new modem. However . . .

In the past I urged folks to literally throw out the DC Modem Paks they had purchased. But I got tired of telling unhappy DC Modem Pak owners this, so I decided to do something about the problem. I have developed a way of altering the Pak (by removing the modem portion) so it functions as an RS-232 Pak. The method will be published in an upcoming issue of THE RAINBOW along with information about having the upgrade performed by a third party. Of course, once the DC Modem Pak has been converted, you'll still need a 1200-bps or higher external modem. You'll also need a Multi-Pak Interface, Slot Pak or a Y cable to use the new pack with your terminal program and disk drives.

Martin H. Goodman, M.D., a physician trained in anesthesiology, is a longtime electronics tinkerer and outspoken commentator — sort of the Howard Cosell of the CoCo world. On Delphi, Marty is the SIGop of RAINBOW's CoCo SIG and database manager of OS-9 Online. His non-computer passions include running, mountaineering and outdoor photography. Marty lives in San Pablo, California.

Printers and Word Processors

Q *My DMP-107 printer does not seem to print correctly in some type styles using DeskMate. What other printers in the $200 to $300 range do you recommend? What other CoCo word processors in the $50 to $150 range do you recommend?*

Brian Spano
Center Marches, New York

A The Panasonic KX-P1124 is an excellent 24-pin (very high quality, NLQ) printer. It is fully compatible with EPSON print codes and can be purchased new for under $300. I highly recommend it. Any other 24-pin printer in this price range would be good, too. Note that used Hewlett-Packard DeskJet printers can be found in the $300 to $400 range. You might consider one of these. I use *Telewriter 80* as my text editor. Many prefer the better features (though poorer screen display) of *Telewriter 128*. VIP software users prefer either *VIP Writer III* or the less expensive and feature-packed *Simply Better*. Others like Microcom's *Word Power 3.2* for its ability to handle columns and a large file size.

Adding Drives

Q *How can I use an old, full-height TRS-80 Disk Drive as Drive 1 with my FD-502 disk drive system as Drive 0?*

George Pindell
Baltimore, Maryland

A You would have to make, or order, a custom cable to hook the FD-502 controller to both the FD-502 and the other drive. You'd also have to make sure the jumpers on the other drive are set to make it think it is Drive 1. These settings depend on the brand of drive used. Then, you must determine if the FD-502 uses a terminator resistor. If so, remove the terminator resistor from the other drive. If not, put a terminator resistor in the other drive. I wrote an article on interfacing disk drives to the CoCo that covered topics like this in a bit more detail (March and April 1990).

Fried 68B09E

Q *My lovely 3-year-old daughter unplugged the disk controller from my CoCo 3 while it was on. The CoCo now appears to work all right for the first few moments, but then it goes crazy as soon as any key is touched. Any suggestions?*

Dan Van Hoy (NV7L)
Naselle, Washington

A Your best bet is to assume the 68B09E processor chip is fried. Desolder it, install a socket and replace the chip. This should cure the problem. If you have access to other CoCo 3s, test the memory and the GIME chip from your CoCo 3 in them (they are all socketed and easily tested). The GIME chip occasionally gets zapped in this situation and, even more rare, memory chips or the PIA gets zapped. But by far the most common scenario is the 6809 getting burned.

Hyperactive Drives

Q *I have a Tandy FD-502 disk drive system that is behaving erratically. Sometimes the drive lights come on of their own accord or a directory is scrambled. This problem occurs with the system plugged into either my old 64K CoCo 2 or my CoCo 3. Any ideas as to what is wrong?*

Christine Megens
Fergus, Ontario
Canada

A Any number of things could be wrong. Some testing is probably in order. First, clean the edge connector on the disk controller. Use a pencil eraser to make both sides of the 40-pin connector bright and shiny. Does that fix the problem? Next, take your disk controller and drives to a friend, or a Radio Shack, and try your controller in a different system. Does the problem appear? If so, you have a bad controller. Next, try their controller with your physical disk drives and cable. Does the problem appear? If so, the problem is either in your cable, the result of a bad drive or a result of improper drive termination. Note that defective 7406 (or 7416) chips in the controller could cause your problem.

Composite Video, To Go

Q *I have a PBJ Word Pak, an ancient 80-column device for the CoCo 1 and 2. I'd like to know if it can be used to help me get monochrome composite video output from my CoCo.*

Kevin Boggs (KEVINBOGGS)
Statesville, North Carolina

A The PBJ 80-column card is a complex video generator with on-board RAM and video-display hardware. Only about two or three of its transistors were used to create and output the NTSC composite-video signal. The circuit used there would not work, in any case, with the Motorola VDG chip in the CoCo. However, it's easy to get excellent composite-monochrome video out of a CoCo 1 or 2. I produced and sold for years a circuit to do this. If you are designing your own circuit, you have to realize that the Y output on the 6847 VDG chip is nearly a proper composite-monochrome video signal, except it is inverted. My little circuit uses three transistors; an emitter follower on the input, then an inverting amplifier followed by a final amplifier. I also used an extra resistor and capacitor to "peak" the circuit and sharpen the image. I still have a few of those circuit boards and kits for that video driver. If you are interested, write me in care of THE RAINBOW. Some CoCo vendors may still be selling video drivers for the CoCo 1 and 2, but supply of those is running out I would think.

Portable CoCo

Q *I am in the process of putting a CoCo 3 into a portable case and using a battery power supply. I have successfully licked the problem of providing regulated +5 volts for the main circuit, +10 volts for one half of the RS-232 converters, and the zero-crossing and voltage-comparator circuits. But I need a way to get -10 volts for the other half of those circuits. Can you suggest a solution?*

Carl J. Boll (CBJ)
Chicago, Illinois

A Two solutions come to mind. The most effective solution is to get a modular DC-to-DC inverter that takes +5 volts as input and provides a -12-volt output. I have a couple of such items, made by ASTEC (the same folks who made the inverter blob used in the Tandy RS-232 Pak that takes +5 volts and puts out 12 volts). Another, less elegant, approach is to simply use a 9-volt transistor radio battery for the negative voltage. Current drain on that line is very low, so the 9-volt battery would probably last for a number of hours. I would recommend the former approach, though, as the best alternative. The problem is getting (in a quantity of one) the inverters — they are not commonly offered at local electronic supply houses. However, they are commonly found at surplus shops and amateur-radio swap meets.

Quick Change Monitor Switch

Q *I have ordered an MM/1, but have only one analog RGB monitor to use with both my CoCo 3 and my MM/1 when it*

Lyra, the ever popular music editor that lets you compose music on a graphics music staff with a mouse, is on sale for only $20! And this includes the 100 page Lyra Companion which is packed with useful information and examples.

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arrives. How might I go about building a switch box for my monitor to switch it between the two computers?

Brian Wright (POLTERGEIST)
Chicago, Illinois

A Your best bet is to purchase a generic, two-position DB-9 switch box. These are available from most PC-clone vendors. Rogers Specialists (805-251-2520) sells such a device (Part Number DS-092) for $18, plus shipping. All you need to do is make appropriate cables to go between the CoCo, the MM/1, the monitor and the DB-9 female connectors on the switch box. Tandy sells DB-9 connectors and hoods. If you contact me via Delphi or THE RAINBOW, I can get you the needed 10-pin, crimp-on connectors used for the CoCo's RGB port. I suggest you use flat ribbon cable wherever possible, and surround each active signal line (R,G, B, Hsync, Vsync) with Ground lines. This process involves a little rescrambling when you solder the wires to the connectors. In the case of the 10-pin, CoCo RGB connector, I usually crimp that to flat ribbon cable. Then, after six inches of cable, shred that cable and solder it to another cable in a fashion that surrounds every active signal with ground wires. For standard CoCo RGB, this requires an 11-conductor ribbon cable (if you want ground on both edges as well as between all five active lines). This approach results in a cleaner video image in cases where there is more than about five feet of cabling involved — the every-other-line-to-ground sort of flat cables behave almost as if they were composed of separate coaxial cables on each active line.

Speaking of Monitors

Q *I foolishly put some speakers on my color monitor, and now the effect of those strong magnets near the picture tube has resulted in a discolored part of the image when I use the monitor. I guess my monitor doesn't do its own degaussing! How can I fix this problem?*

Scott Corley (SCOTTJ)
Clairton, Pennsylvania

A Your monitor probably does its own degaussing (to some extent) but was not up to the amount of magnetizing of the tube's innards that you accomplished with those strong speaker magnets. I recommend you get a cassette-tape or video-tape bulk eraser. Turn the eraser on a couple of feet from the picture tube and slowly bring it closer to the tube. Once it is against the tube, move the eraser around with a wiping motion over the area of the surface of the tube that is affected. After about 30 seconds, slowly remove the eraser from the picture tube before turning it off. I once found this approach to work with a color monitor I had "discolored" by resting another operating color monitor on top of it, influencing it with its magnetic field. You may not be able to totally cure the problem immediately, but it should improve a lot. The set's own demagnetization will then likely take over and completely cure the discoloration after a while.

Multi-Pak Upgrade

Q *I just bought an older 26-3024 Multi-Pak Interface. Is this the one that requires a $15 upgrade consisting of replacing a socketted PAL chip? Should I strap the *CART interrupt pins on the Multi-Pak?*

Francis Swygert (DSRTFOX)
Warner Robins, Georgia

A Yes, the older 26-3024 Multi-Pak is upgraded by replacing a 20-pin, socketted PAL chip with a new PAL chip. If you will not be using autostart ROM packs in this Multi-Pak, and especially if you intend to use the MPI with an OS-9 system, it is desirable to strap the *CART interrupts on the unit. This consists of shorting Pin 8 on each of the four slots together and tying them to Pin 8 on the edge connector that plugs into the CoCo. You may want to remove the pull-up resistors connected to Pin 8 on two or three of the 40-pin slots.

Direct-Drive Serial Ports

Q *I'm working on a project that involves hooking the input and output pins of a 6551 ACIA (like that used in the RS-232 Pak) directly to another device without running them through TTL to RS-232 level converters. How long a cable can I use for the TTL-level, serial signals generated by the 6551 chip?*

Lonnie McClure (LMCCLURE)
Chattanooga, Tennessee

A This question is similar to that of "how far can I run a parallel printer cable?" If anything, I would think the signals from the 6551 at TTL (0/5-volt) levels might go a little further than in a parallel printer cable because they are not carrying as much data as fast. Based on this line of reasoning, I am rather confident that you could use a cable of up to six feet without problems and you might find you could take the signals 12 feet, or more, and still have a reliable system. For increased reliability at even greater lengths, I suggest using large-gauge (22 or bigger) wires in the cable. Note that the TTL-level signals coming out of the 6551 chip are inverted with respect to the usual signal levels (-12 to +12 volt) expected for RS-232.

I Can't Hear a Thing

Q *Recently, I found I could not get audio through my CoCo 3 RGB port, but the audio was available from the RCA phono connector on the back of the CoCo. How should I proceed to find the problem and fix it?*

Ted Jaeger (TEDJAEGER)
Fayetteville, North Carolina

A Pin 7 of the RGB port should be connected directly to the center pin of the RCA phono jack for audio. Apparently, this

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connection has been severed for some reason, perhaps due to a cold solder joint where Pin 7 of the RGB port is connected. Or perhaps the pad for Pin 7 has cracked from repeated plugging and unplugging of an RGB connector. This situation could also be caused by a hairline crack or break in the traces on the board.

I would confirm that there is no continuity between Pin 7 of the video connector and the center of the audio connector. Use an ohmmeter set on the RX10 scale.

If you get 0 ohms resistance between Pin 7 of the RGB connector and the center conductor of the audio jack, the problem is not in your CoCo at all, but rather in the cable for your monitor, or in the amplifier or speaker of the monitor. Perhaps the 10-pin connector is now making flaky contact with the cable due to tugging during insertion and removal. This can be fixed by recrimping the connector, or by removing the connector and crimping on a new one.

If the ohmeter goes to infinity (no continuity) between Pin 7 of the RGB connector and the center of the audio jack, run a jumper wire between Pin 7 of the RGB connector and the center of the audio connector. If you want to trace things, note that the sound output comes from the negative (minus) side of C56 (a 10-µF, 25-volt electrolytic cap), whose positive side is fed by the collector of transistor Q4. Q4 and C56 are located near the audio-output connector. There's also a .022-µF capacitor going from the final audio output to ground. This is C57, which acts as a high-frequency filter.

Halted by a Cable

Q *I have a problem using a No-Hålt controller when my Multi-Pak Interface is separated from my CoCo by 30 cm of 40-conductor ribbon cable. What is wrong?*
Maarten (AMJ) Van Wamelen
Oedelem, Belgium

A Even very short lengths of ribbon cable between the CoCo and the Multi-Pak Interface can cause subtle problems. The cause is probably capacitance in the ribbon cable. I recommend not using ribbon cable at all, or using a very short ribbon cable (3 cm or less). Why are you using that ribbon cable? To better make room for the CoCo system on your desk? If so, let me suggest a better solution that results in a more reliable machine. Put the CoCo, with the MPI plugged directly into it, off to one side or above or below your main work area. Buy either a Bob Puppo-style IBM keyboard adapter from Frank Hogg Laboratories, or a "Marty Goodman" keyboard-extender cable from Microcom. Either allows you to have most of your system away from the desktop and still have the keyboard comfortably in your lap or on your desk. Extending the keyboard through a ribbon cable does not cause the same reliability problems as extending the fragile 40-conductor, high-speed main bus of the computer.

Your technical questions are welcomed. Please address them to CoCo Consultations, THE RAINBOW, P. O. Box 385, Prospect, KY 40059.

We reserve the right to publish only questions of general interest and to edit for brevity and clarity. Due to the large volume of mail we receive, we are unable to answer letters individually.

Questions can also be sent to Marty through the Delphi CoCo SIG. From the CoCo SIG> prompt, pick Rainbow Magazine Services. Then at the RAINBOW> prompt , type ASK (for Ask the Experts) to arrive at the EXPERTS> prompt , where you can select the "CoCo Consultations" online form, which has complete instructions.

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CoCo 3 returns to the classics

Tic-Tac

by David Ridings

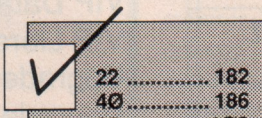
Tic-Tac is a computerized version of the classic game *Tic-Tac-Toe*. The competition is not with another person, but with a computer-generated opponent and an onscreen Cat. (For those unfamiliar with the rules of *Tic-Tac-Toe*, any games not won by you or your opponent are automatically scored in favor of the Cat.) Competition is tough as you try to outwit the computer's strategy. But beating your inanimate opponents is not as easy as it sounds. *Tic-Tac* requires more than just casual participation; it demands careful planning to ensure victory.

The program requires a CoCo 3. To get it going, plug a joystick into the right joystick port and enter `RUN"TIC-TAC"`. The players appear onscreen with the gameboard. Press the joystick button to turn on a spotlight and start the game. The computer chooses which player begins the game. To make a move, press the number that corresponds to the desired square on the board. Press the joystick button to enter your selection and place the X on the board. If you change your mind after pressing the number, press the space bar and enter another number. The program records the number of games won by each player during competition. The first player to win 10 games is the champion.

I hope *Tic-Tac* finds a good home in your software library. ❑

David Ridings spends his spare time writing CoCo software for his son, Dan, who has cerebral palsy. Through running these programs, Dan gains a sense of pride in showing others what he can do. David can be contacted at 3058 Donnycave, Maryland Heights, MO 63043, (314) 291-2854.

CoCo 3



```
22 ..... 182    362 ..... 32    672 ..... 209    831 ..... 126
40 ..... 186    391 ..... 252   711 ..... 57     868 ..... 200
65 ..... 109    412 ..... 126   717 ..... 215    884 ..... 158
125 ..... 160   452 ..... 188   725 ..... 7      917 ..... 110
211 ..... 212   492 ..... 219   811 ..... 63     END ..... 0
235 ..... 184   543 ..... 31    817 ..... 97
299 ..... 242   621 ..... 189   824 ..... 110
333 ..... 94    636 ..... 246   828 ..... 214
```

The Listing: `TIC-TAC`

```
1 'TIC-TAC
2 'WRITTEN BY DAVID RIDINGS
3 'COPYRIGHT (C) MARCH 1991
4 'BY FALSOFT, INC.
5 'RAINBOW MAGAZINE
11 GOSUB911
12 PC=7:NC=3:BC=11:GOSUB926
15 X$="BM=X;,=Y;"
17 HBUFF1,99:HBUFF2,999:HBUFF3,999:HBUFF4,2999
21 TT$="D110BR40U110D35R40L120BD40R120"
22 TA$="C12R89D4L89U4C8":TB$="C12R4D84L4U84C8":TC$="C12BL2BD2E69F3G69H3C8":TD$="C12BR1F69G3H69E3C8"
31 HLINE(3,44)-(316,48),PSET,B:HPAINT(4,46),BC,8
33 HLINE(100,3)-(104,44),PSET,B:HPAINT(101,5),BC,8:HLINE(206,3)-(210,44),PSET,B:HPAINT(207,5),BC,8
34 A=-55:B=22:FORD=1TO3:A=A+104:HLINE(A,B)-(A+9,B+4),PSET,B:HPAINT(A+1,B+1),BC,8:NEXTD
35 X=28:Y=18:GOSUB830
36 X=235:Y=19:GOSUB812
37 X=129:Y=18:GOSUB831
```

```
38 HPAINT(5,5),10,8:HPAINT(109,5
),10,8:HPAINT(214,5),10,8
40 X=79:Y=18:GOSUB829:X=183:Y=18
:GOSUB829:X=287:Y=18:GOSUB829
43 HCIRCLE(11,37),4:HCIRCLE(112,
37),4
45 HLINE(176,55)-(310,180),PSET,
B:HPAINT(7,52),14,8
47 A=135:B=44
48 FORD=1TO8:B=B+16:GOSUB95:NEXT
D
49 B=44:A=A-16:IF A<18 THEN61
50 GOTO48
61 HCOLOR14:HLINE(5,51)-(31,75),
PSET,BF:HCOLOR8
62 HDRAW"BM22,65D7F2R2E2U12H2L2G
2D5U3L12G2D4F2R12L5BU8U13L1D13"
63 HPAINT(21,65),8,8:HPAINT(23,6
5),3,8
65 HCOLOR12:HLINE(20,163)-(115,1
79),PSET,B:HCOLOR11:HLINE(21,164
)-(114,178),PSET,B:HCOLOR12:HLIN
E(22,165)-(113,177),PSET,B:HPAIN
T(55,170),10,12:HCOLOR8
66 HPRINT(3,21),"TIC-TAC-TOE"
91 GOSUB922:GOTO101
95 HCIRCLE(A,B),6:HPAINT(A,B),11
,8:RETURN
101 HPAINT(23,65),1,8
103 HCOLOR1:HLINE(26,61)-(169,58
),PSET:HLINE(169,58)-(169,111),P
SET:HLINE(169,111)-(26,70),PSET:
HCOLOR8
104 HPAINT(43,67),0,1:GOSUB121:G
OTO125
121 HCOLOR11:X=223:Y=61:HDRAWX$+
TT$:X=224:Y=63:HDRAWX$+TT$:HCOLO
R10:X=225:Y=62:HDRAWX$+TT$:HCOLO
R8:RETURN
125 X=242:Y=112:GOSUB829:X=201:Y
=77:GOSUB833:X=284:Y=157:GOSUB83
3
127 HGET(188,62)-(218,93),2:HGET
(228,102)-(258,133),3
128 HCOLOR4:HLINE(188,62)-(218,9
3),PSET,BF:HLINE(228,102)-(258,1
33),PSET,BF:HLINE(268,142)-(298,
173),PSET,BF:HCOLOR8:GOSUB129:GO
TO202
129 HPRINT(25,9),"1    2    3":H
PRINT(25,14),"4    5    6":HPRIN
T(25,19),"7    8    9":RETURN
133 X=202:Y=158:HDRAWX$+TC$
134 GOTO134
202 HPAINT(11,37),10,8:HPAINT(11
2,37),10,8:R=RND(2):ON R GOTO 21
1,261
211 HPAINT(11,37),3,8:A$=INKEY$
212 IF A$>CHR$(48)AND A$<CHR$(58
)THEN221
213 GOSUB851
214 HPAINT(11,37),10,8
215 GOSUB851
216 GOTO211
221 IF A$=CHR$(49)THEN GOSUB311
222 IF A$=CHR$(50)THEN GOSUB321
223 IF A$=CHR$(51)THEN GOSUB331
224 IF A$=CHR$(52)THEN GOSUB341
225 IF A$=CHR$(53)THEN GOSUB351
226 IF A$=CHR$(54)THEN GOSUB361
227 IF A$=CHR$(55)THEN GOSUB371
228 IF A$=CHR$(56)THEN GOSUB381
229 IF A$=CHR$(57)THEN GOSUB391
235 GOSUB918:GOSUB711:IF T=9 THE
N731
237 HPAINT(11,37),10,8
239 GOTO261
261 FORF=1TO1:HPAINT(112,37),3,8
262 FORP=1TO3:GOSUB851:NEXTP
264 HPAINT(112,37),10,8
265 FORP=1TO3:GOSUB851:NEXTP
266 HPAINT(112,37),3,8
267 NEXTF
271 R=RND(9):GOSUB861
272 ON R GOSUB411,421,431,441,45
1,461,471,481,491
275 GOSUB918:GOSUB711:IF T=9 THE
N731
277 HPAINT(112,37),10,8
298 GOTO211
299 GOTO299
311 IF L(1)=1 THEN 211
312 N(1)=24:N(2)=9:N(3)=1:GOSUB3
97
313 L(1)=1:A(1)=1:T=T+1
314 HPUT(188,62)-(218,93),2
315 RETURN
321 IF L(2)=1 THEN 211
322 N(1)=29:N(2)=9:N(3)=2:GOSUB3
97
323 L(2)=1:A(2)=1:T=T+1
324 HPUT(228,62)-(258,93),2
325 RETURN
331 IF L(3)=1 THEN211
332 N(1)=34:N(2)=9:N(3)=3:GOSUB3
97
333 L(3)=1:A(3)=1:T=T+1
334 HPUT(268,62)-(298,93),2
335 RETURN
341 IF L(4)=1 THEN211
342 N(1)=24:N(2)=14:N(3)=4:GOSUB
397
343 L(4)=1:A(4)=1:T=T+1
344 HPUT(188,102)-(218,133),2
345 RETURN
351 IF L(5)=1 THEN211
352 N(1)=29:N(2)=14:N(3)=5:GOSUB
397
353 L(5)=1:A(5)=1:T=T+1
354 HPUT(228,102)-(258,133),2
355 RETURN
361 IF L(6)=1 THEN211
362 N(1)=34:N(2)=14:N(3)=6:GOSUB
397
363 L(6)=1:A(6)=1:T=T+1
364 HPUT(268,102)-(298,133),2
365 RETURN
371 IF L(7)=1 THEN211
372 N(1)=24:N(2)=19:N(3)=7:GOSUB
397
373 L(7)=1:A(7)=1:T=T+1
374 HPUT(188,142)-(218,173),2
375 RETURN
381 IF L(8)=1 THEN211
382 N(1)=29:N(2)=19:N(3)=8:GOSUB
397
383 L(8)=1:A(8)=1:T=T+1
384 HPUT(228,142)-(258,173),2
385 RETURN
391 IF L(9)=1 THEN211
392 N(1)=34:N(2)=19:N(3)=9:GOSUB
397
393 L(9)=1:A(9)=1:T=T+1
394 HPUT(268,142)-(298,173),2
395 RETURN
397 HCOLOR4:HPRINT(N(1),N(2)),N(
3):FORD=1TO29:IF BUTTON(0)=1 THE
N HCOLOR8:RETURN
398 B$=INKEY$:IF B$=CHR$(32)THEN
 HCOLOR8:HPRINT(N(1),N(2)),N(3):
GOTO211
399 NEXTD:HCOLOR8:HPRINT(N(1),N(
2)),N(3):FORF=1TO49:NEXTF:GOTO39
7
411 IF L(1)=1 THEN 271
412 L(1)=1:A(1)=2:T=T+1
413 HPUT(188,62)-(218,93),3
419 RETURN
421 IF L(2)=1 THEN271
422 L(2)=1:A(2)=2:T=T+1
423 HPUT(228,62)-(258,93),3
429 RETURN
431 IF L(3)=1 THEN 271
432 L(3)=1:A(3)=2:T=T+1
433 HPUT(268,62)-(298,93),3
439 RETURN
441 IF L(4)=1 THEN 271
442 L(4)=1:A(4)=2:T=T+1
443 HPUT(188,102)-(218,133),3
449 RETURN
451 IF L(5)=1 THEN 271
452 L(5)=1:A(5)=2:T=T+1
453 HPUT(228,102)-(258,133),3
459 RETURN
461 IF L(6)=1 THEN 271
462 L(6)=1:A(6)=2:T=T+1
463 HPUT(268,102)-(298,133),3
469 RETURN
471 IF L(7)=1 THEN 271
472 L(7)=1:A(7)=2:T=T+1
473 HPUT(188,142)-(218,173),3
479 RETURN
481 IF L(8)=1 THEN 271
482 L(8)=1:A(8)=2:T=T+1
483 HPUT(228,142)-(258,173),3
489 RETURN
491 IF L(9)=1 THEN 271
492 L(9)=1:A(9)=2:T=T+1
493 HPUT(268,142)-(298,173),3
499 RETURN
511 HGET(3,3)-(100,44),4
512 HPUT(193,75)-(290,116),4
515 GOTO541
521 HGET(104,3)-(206,44),4
522 HPUT(193,75)-(295,116),4
525 GOTO541
531 HGET(210,3)-(316,44),4
532 HPUT(193,75)-(299,116),4
535 GOTO541
541 HPRINT(25,16),"W I N N E R"
542 GOSUB917
543 FORF=1TO29:PALETTE0,49:FORP=
1TO49:NEXTP:PALETTE0,62:FORP=1TO
49:NEXTP,F
544 FORZ=1TO4:HBUFF(Z)=0:NEXTZ
545 SA=0:SB=0:SC=0:GOTO1
551 GOTO551
611 SA=SA+1:HCOLOR10:HLINE(64,8)
-(96,38),PSET,BF:HCOLOR8:X=79:Y=
18:IF SA=10THENGOSUB811:GOTO651
612 IF SA=9THENGOSUB828:GOTO651
613 IF SA=1THEN GOSUB816:GOTO651
614 IF SA=2THENGOSUB818:GOTO651
615 IF SA=3THENGOSUB820:GOTO651
616 IF SA=4THENGOSUB822:GOTO651
617 IF SA=5THENGOSUB824:GOTO651
618 IF SA=6THENGOSUB825:GOTO651
619 IF SA=7THENGOSUB826:GOTO651
620 IF SA=8THENGOSUB827:GOTO651
621 SB=SB+1:HCOLOR10:HLINE(168,8
)-(200,38),PSET,BF:HCOLOR8:X=183
:Y=18:IF SB=10THENGOSUB811:GOTO6
61
622 IF SB=9THENGOSUB828:GOTO661
623 IF SB=1THENGOSUB816:GOTO661
624 IF SB=2THENGOSUB818:GOTO661
625 IF SB=3THENGOSUB820:GOTO661
626 IF SB=4THENGOSUB822:GOTO661
```

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627 IF SB=5THENGOSUB824:GOTO661
628 IF SB=6THENGOSUB825:GOTO661
629 IF SB=7THENGOSUB826:GOTO661
630 IF SB=8THENGOSUB827:GOTO661
631 SC=SC+1:HCOLOR10:HLINE(272,8
)-(304,38),PSET,BF:HCOLOR8
632 X=287:Y=18
633 IF SC=1THENGOSUB816:GOTO671
634 IF SC=2THENGOSUB818:GOTO671
635 IF SC=3THENGOSUB820:GOTO671
636 IF SC=4THENGOSUB822:GOTO671
637 IF SC=5THENGOSUB824:GOTO671
638 IF SC=6THENGOSUB825:GOTO671
639 IF SC=7THENGOSUB826:GOTO671
640 IF SC=8THENGOSUB827:GOTO671
641 IF SC=9THENGOSUB828:GOTO671
642 IF SC=10THENGOSUB811:GOTO671
651 'WIN-DAN
652 FORD=1TO3:GOSUB917:NEXTD
653 GOTO681
661 'WIN-COMP
662 GOSUB917:FORD=1TO3:GOSUB921:
NEXTD
663 GOTO681
671 'WIN-CAT
672 GOSUB917:FORD=1TO9:GOSUB918:
NEXTD
673 GOTO681
681 FORF=1TO19:PALETTE0,49:FORP=
1TO49:NEXTP:PALETTE0,62:FORP=1TO
49:NEXTP,F
682 HCOLOR4:HLINE(178,57)-(308,1
78),PSET,BF:HCOLOR8
691 FORQ=1TO9:A(Q)=0:L(Q)=0:NEXT
Q:T=0
693 IF SA=10THEN511
694 IF SB=10THEN521
695 IF SC=10THEN531
697 GOSUB121:GOSUB129
699 GOTO202
711 IF A(1)=2 AND A(1)=A(2)AND A
(1)=A(3)THEN X=198:Y=75:TL$=TA$:
GOTO751
712 IF A(1)=2 AND A(1)=A(4)AND A
(1)=A(7)THEN X=201:Y=75:TL$=TB$:
GOTO751
713 IF A(1)=2 AND A(1)=A(5)AND A
(1)=A(9)THEN X=209:Y=81:TL$=TD$:
GOTO751
714 IF A(2)=2 AND A(2)=A(5)AND A
(2)=A(8)THEN X=241:Y=75:TL$=TB$:
GOTO751
715 IF A(3)=2 AND A(3)=A(6)AND A
(3)=A(9)THEN X=281:Y=75:TL$=TB$:
GOTO751
716 IF A(3)=2 AND A(3)=A(5)AND A
(3)=A(7)THEN X=209:Y=149:TL$=TC$
:GOTO751
717 IF A(4)=2 AND A(4)=A(5)AND A
(4)=A(6)THEN X=198:Y=115:TL$=TA$
:GOTO751
718 IF A(7)=2 AND A(7)=A(8)AND A
(7)=A(9)THEN X=198:Y=155:TL$=TA$
:GOTO751
721 IF A(1)=1 AND A(2)=1 AND A(3
)=1 THEN X=198:Y=75:TL$=TA$:GOTO
771
722 IF A(1)=1 AND A(4)=1 AND A(7
)=1 THEN X=201:Y=75:TL$=TB$:GOTO
771
723 IF A(1)=1 AND A(5)=1 AND A(9
)=1 THEN X=209:Y=81:TL$=TD$:GOTO
771
724 IF A(2)=1 AND A(5)=1 AND A(8
)=1 THEN X=241:Y=75:TL$=TB$:GOTO
771
725 IF A(3)=1 AND A(6)=1 AND A(9
)=1 THEN X=281:Y=75:TL$=TB$:GOTO
771
726 IF A(3)=1 AND A(5)=1 AND A(7
)=1 THEN X=209:Y=149:TL$=TC$:GOT
O771
727 IF A(4)=1 AND A(5)=1 AND A(6
)=1 THEN X=198:Y=115:TL$=TA$:GOT
O771
728 IF A(7)=1 AND A(8)=1 AND A(9
)=1 THEN X=198:Y=155:TL$=TA$:GOT
O771
729 RETURN
731 GOTO631
751 HDRAWX$+TL$:HPAINT(X+1,Y+1),
0,12:GOTO621
771 HDRAWX$+TL$:HPAINT(X+1,Y+1),
0,12:GOTO611
811 X=X-11:Y=Y-5:TN$="D20R5U20L5
BR12G3D14F3R9E3U14H3L9BD4BR3G1D1
0F1R3E1U10H1L3":HDRAWX$+TN$:HPAI
NT(X+1,Y+1),NC,8:HPAINT(X+12,Y+1
),NC,8:XA$=" TEN":RETURN
812 X=X+12:Y=Y+2:CT$="BL1E2U8G6H
3L7G3H6D8F2D7F7R6E7U7":HDRAW X$+
CT$
813 HCIRCLE(X-16,Y),3,,.6:HCIRCL
E(X-8,Y),3,,.6:HCIRCLE(X-12,Y+4)
,3,,.8:HCIRCLE(X-12,Y+9),5,,.4
814 HLINE(X-6,Y+3)-(X+4,Y+3),PSE
T:HLINE(X-6,Y+6)-(X+1,Y+10),PSET
:HLINE(X-18,Y+3)-(X-24,Y+3),PSET
:HLINE(X-18,Y+6)-(X-24,Y+10),PSE
T
815 HPAINT(X-1,Y-1),15,8:XB$=" C
AT":RETURN
816 X=X-3:Y=Y-2:OE$="D16L4D3R14U
3L4U20L9D3R2"
817 HDRAW X$+OE$:HPAINT(X+2,Y),N
C,8:XB$=" ONE":RETURN
818 X=X-10:Y=Y-1:TW$="U3E3R13F3D
8G3L11D4R9U2R5D6L19U9E3R10E1U4H1
L7G1D2L5"
819 HDRAW X$+TW$:HPAINT(X+1,Y-2)
,NC,8:XB$=" TWO":RETURN
820 X=X-10:Y=Y-1:TH$="U3E3R13F3D
6G2F2D6G3L13H3U4R5D2F1R6E1U3H1L6
U4R6E1U3H1L6G1D2L5U2":HDRAW X$+T
H$:HPAINT(X+2,Y),NC,8
821 XB$="THREE":RETURN
822 X=X+5:Y=Y-7:FO$="D11R5D5L5D7
L5U7L11U5E11R5L5BD8D4L5E5"
823 HDRAW X$+FO$:HPAINT(X-1,Y+1)
,NC,8:XB$=" FOUR":RETURN
824 X=X-9:Y=Y-6:FI$="R17D5L12D3R
9F3D7G3L14U5R11E1U1H1L11U12":HDR
AW X$+FI$:HPAINT(X+2,Y+2),NC,8:X
B$=" FIVE":RETURN
825 X=X+9:Y=Y-1:SX$="U3H3L11G3D1
6F3R11E3U7H3L9U3E1R5F1D1R5BD6BL6
L5G1D2F1R5E1U2H1":HDRAW X$+SX$:H
PAINT(X-2,Y-2),NC,8:XB$=" SIX":R
ETURN
826 X=X-9:SV$="U6R20D5G9D8L6U9E9
L9D2L5":HDRAWX$+SV$:HPAINT(X+2,Y
-2),NC,8:XB$="SEVEN":RETURN
827 X=X-7:Y=Y+5:EI$="H2U6E3R14F3
D6G2F2D6G3L14H3U6E2BR5BU3H1U2E1R
6F1D2G1L6BD5G1D2F1R6E1U2H1L6":HD
RAWX$+EI$:HPAINT(X+2,Y),NC,8:XB$
="EIGHT":RETURN
828 X=X-7:Y=Y+11:NI$="D3F3R11E3U
15H3L11G3D6F3R9D3G1L6U2L5BU6BR6R
5E1U2H1L5G1D2F1":HDRAWX$+NI$:HPA
INT(X+2,Y+1),NC,8:XB$=" NINE":RE
TURN
829 X=X-5:Y=Y-5:ZE$="G3D14F3R12E
3U14H3L12BD4BR3G1D10F1R6E1U10H1L
6":HDRAWX$+ZE$:HPAINT(X+2,Y+1),N
C,8:XA$="ZERO":RETURN
830 HCIRCLE(X,Y+5),12:HCIRCLE(X,
Y-4),13,13,.3:HPAINT(X,Y-4),12,1
3:HCIRCLE(X,Y-4),13,8,.3:HA$="C8
BL5BD2R2D2L2U2BR8R2D2L2U2BD4BL2L
2D2R2U2BR4BD2D1G3L4H3U1BL8U5BR26
D5":HDRAWX$+HA$:XC$="HAPPY":RETU
RN
831 HCIRCLE(X,Y+5),13:HCIRCLE(X-
5,Y+4),6,,.5:HCIRCLE(X+5,Y+4),6,
,.5:HPAINT(X,Y-3),8,8:VI$="BD10B
L1U2R2D2L2BD2L2G1E1R6F1L8BL5BU9U
12D1H1F2BR16E2G1U1D12U12F1H2BL16
G2":HDRAWX$+VI$
832 RETURN
833 CX$="G9R6E5F5R6H9E9L6G5H5L6F
9":HDRAWX$+CX$:HPAINT(X+1,Y),3,8
:RETURN
851 C=RND(155):C=C+9:D=RND(130):
D=D+57:CC=RND(15):HGET(C-4,D-4)-
(C+4,D+4),1:HCIRCLE(C,D),2,CC:HP
UT(C-4,D-4)-(C+4,D+4),1:RETURN
861 G=1:H=2:J=3:GOSUB895
862 G=1:H=4:J=7:GOSUB895
863 G=1:H=5:J=9:GOSUB895
864 G=2:H=3:J=1:GOSUB895
865 G=2:H=5:J=8:GOSUB895
866 G=3:H=1:J=2:GOSUB895
867 G=3:H=5:J=7:GOSUB895
868 G=3:H=6:J=9:GOSUB895
869 G=4:H=7:J=1:GOSUB895
870 G=4:H=5:J=6:GOSUB895
871 G=5:H=6:J=4:GOSUB895
872 G=5:H=9:J=1:GOSUB895
873 G=5:H=8:J=2:GOSUB895
874 G=5:H=7:J=3:GOSUB895
875 G=6:H=9:J=3:GOSUB895
876 G=6:H=4:J=5:GOSUB895
877 G=7:H=8:J=9:GOSUB895
878 G=7:H=1:J=7:GOSUB895
879 G=7:H=3:J=5:GOSUB895
880 G=8:H=9:J=7:GOSUB895
881 G=8:H=2:J=5:GOSUB895
882 G=9:H=1:J=5:GOSUB895
883 G=9:H=7:J=8:GOSUB895
884 G=9:H=3:J=6:GOSUB895
885 G=1:H=7:J=4:GOSUB895
887 RETURN
895 IF T=8 AND A(R)=0 THEN 272
896 IF A(G)=1 AND A(H)=1 AND A(J
)=0 THEN R=J
897 IF A(G)=2 AND A(H)=2 AND A(J
)=0 THEN R=J:GOTO272
899 RETURN
911 ON BRK GOTO 916
912 PALETTE RGB:HSCREEN2:HCLS4:H
COLOR8:POKE65497,0:PALETTE0,62:P
ALETTE10,49:PALETTE11,14:PALETTE
12,2:PALETTE13,4:PALETTE14,7:PAL
ETTE15,52:RETURN
916 PALETTE RGB:END
917 PLAY"O1T160CDEFGABO2CDEFGABO
3CDEFGABO4CDEFGAB":RETURN
918 PLAY"O2T160CDEFGAB":RETURN
919 FORT=151TO141 STEP-1:SOUNDT,
1:NEXTT:SOUND41,9:RETURN
921 PLAY"O1T160CDEFGABO1CDEFGABO
1CDEFGABO1CDEFGAB":RETURN
922 IF BUTTON(0)=1 THEN RETURN
923 GOTO922
925 RETURN
926 HLINE(3,3)-(316,188),PSET,B:
HPAINT(1,1),BC,8:RETURN
```

Novices Niche

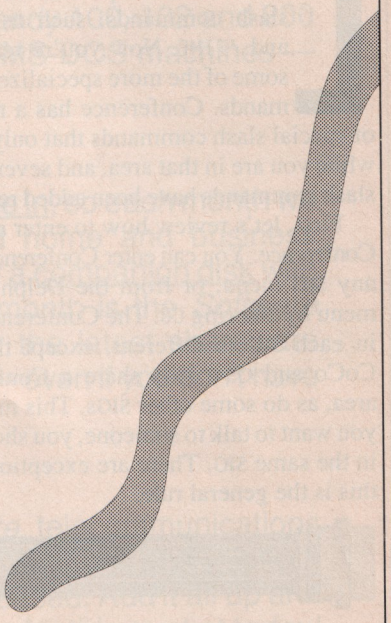
Freedom

By Richard Estrado

Freedom is a graphics program that creates a snake of lines that move randomly around the screen, much like the arcade game *Qix*. CoCo 1 and 2 users need to change Line 80 to POKE 65495,0. If your CoCo doesn't support the high-speed mode, leave Line 80 out altogether. After pressing BREAK to stop the program, make sure you set the computer back to normal speed using POKE 65496,0 (or POKE 65494,0 for the CoCo 1 and 2). Explore and enjoy!

The Listing: FREEDOM

```
1 'FREEDOM
2 'WRITTEN BY RICHARD ESTRADO
3 'COPYRIGHT (C) APRIL 1991
4 'BY FALSOFT, INC.
5 'RAINBOW MAGAZINE
10 '********************
20 '*     FREEDOM      *
30 '*                  *
40 '*  by R.ESTRADO    *
50 '********************
60 '
70 '        OMMIT LINE 80 FOR CO
CO1,COCO2
80 POKE 65497,0
90 '        INITIALIZE
100 DIM R(20),P(20),Q(20),S(20)
110 PMODE 4,1:SCREEN 1,1:PCLS
120 P(0)=128:Q(0)=100:R(0)=128:S
(0)=100
130 P=1:PP=2
140 '       MAIN PROGRAM
150 A=RND(0)*2-1:B=RND(0)*2-1:C=
RND(0)*2-1:D=RND(0)*2-1
160 A=A*5:B=B*5:C=C*5:D=D*5
170 FOR X=1 TO 15+RND(20)
180 GOSUB 290
190 IF P=20 GOSUB 350
200 IF ABS(P(P)-R(P))>50 THEN A=
-A:C=-C
210 IF ABS(Q(P)-S(P))>40 THEN B=
-B:D=-D
220 LINE (P(PP),Q(PP))-(R(PP),S(
PP)),PRESET
230 LINE (P(P),Q(P))-(R(P),S(P))
,PSET
240 P=P+1:IF P=21 THEN P=1
250 PP=PP+1:IF PP=21 THEN PP=1
260 NEXT X
270 GOTO 140
280 '      CHECK BOUNDARIES
290 P(P)=P(P-1)+A:IF P(P)>250 OR
 P(P)<5 THEN A=-A:P(P)=P(P)+A
300 Q(P)=Q(P-1)+B:IF Q(P)>192 OR
 Q(P)<5 THEN B=-B:Q(P)=Q(P)+B
310 R(P)=R(P-1)+C:IF R(P)>250 OR
 R(P)<5 THEN C=-C:R(P)=R(P)+C
320 S(P)=S(P-1)+D:IF S(P)>250 OR
 S(P)<5 THEN D=-D:S(P)=S(P)+D
330 RETURN
340 '       LINK ARRAY
350 P(0)=P(20):Q(0)=Q(20):R(0)=R
(20):S(0)=S(20)
360 RETURN
```



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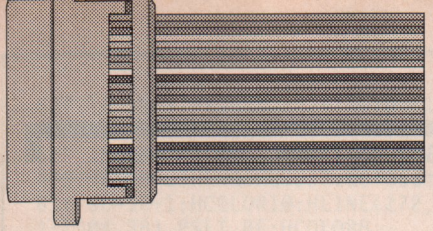
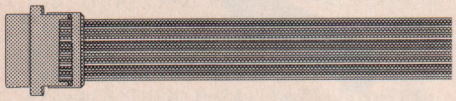


Conference

by Eddie Kuns
OS-9 SIG Database Manager

Last month I explained the basic slash commands, such as /SEND and /TIME. Now you're ready for some of the more specialized commands. Conference has a number of special slash commands that only apply while you are in that area, and several new slash commands have been added recently.

First, let's review how to enter and use Conference. You can enter Conference from any SIG menu, or from the Delphi Main menu by entering CO. The Conference area in each SIG is different, except that the CoCo and OS-9 SIGs share a Conference area, as do some other SIGs. This means if you want to talk to someone, you should be in the same SIG. There are exceptions, but this is the general rule.



When you enter Conference, you see the Conference> prompt. You are now "idle" in Conference, which means you have not yet entered a Conference group. (Groups are user-definable areas within Conference. Delphi allows several separate groups of people to talk with each other in each Conference area.) There are several commands you can use in idle, but you can't talk to anyone yet. The first command I usually enter at this prompt is /NAME Eddie. This slash command gives me a handle, or nickname, which lasts for as long as I am in Conference or until I use the command again. Now, if you enter the /WHO command, you see something like

```
GROUP LIST:   02:05:46
13)  SCRAMBLE Word Game
   GAME, Jim
20)  Late Night Chat
   Joel, Bob K, Rick
   - idle
   Eddie
AVAILABLE LIST: () = in conf
   MYCROFTH, (EDDIEKUNS),
   (JOELHEGBERG), (JIMISSEL),
   (BOBKEMPER), (GAME),
   DANMONDAY, JAHICKS,
   (RICKADAMS)
—— [8 in this area]
```

This is similar to the normal (outside Conference) /WHO slash command, but gives you more information. For example, people are listed by their handles, if they have set one. The members of the different groups in this Conference area are also listed. You can belong to more than one group at a time, but that's a topic for later discussion — it can get really confusing!

In the above listing, you see two groups in Conference: SCRAMBLE Word Game and Late Night Chat. If you want to join an existing group, enter

JOIN *groupname*

When I joined Late Night Chat by entering JOIN late, my arrival in the group was announced with

```
** .Eddie just joined "Late Nigh
t Chat" (4 members now) **
```

Notice that you need only type enough of the group name to make it unique. Also, my name has a period before it in the announcement. The period is Delphi's way of telling you the name is a handle and not an actual Delphi username. Another way to join a group is to enter

JOIN *groupnumber*

using the group number shown by /WHO.

Once you have entered a group, anything you type (except a slash command) is sent to everyone in the group when you press ENTER. And you see everything entered by everyone else in the group. A short bit of discussion may look like:

```
.Jim> THAT doesn't happen often.
.Rick> yes it does!
.Randy> Me too. I have pretty we
ll ruled out electrical interfer
ence.
RICKADAMS>> it's a thought.
.Joel> Crashed again, but I thin
k the modpatch worked.
Whew!
.Eddie> Whew!
.Joel> I just got an invalid mod
patch command at the end, but I
think it's
.Joel> just a blank line.
** .Steve just joined "Chat" (6
members now) **
```

Remember last month when I covered /SEND? Look carefully. A regular Conference message has the sender's name (or handle) followed by a single greater-than sign (>). A message sent to you with /SEND has the person's Delphi username followed by two greater-than signs (>>). This tells you the message is private, or personal. I was the only user to see the message from RICKADAMS shown above. On some termi-

Eddie Kuns is pursuing a PhD in physics at Rutgers University. He lives in Aurora, Illinois and works as a programmer and researcher at Fermilab. Eddie is co-manager of the CoCo SIG; his username is EDDIEKUNS.

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nals, and with most terminal programs, a bell rings or the computer beeps when you receive a personal message.

Notice the two occurrences of Whew! in the above dialog. The first time you see it is when I typed it. The second time is a "repeat" from Delphi. Remember, unless otherwise instructed, Delphi's Conference system sends all messages to all people in the group, even the original sender. To turn this off, use /NOREPEAT. To turn it back on, enter /REPEAT.

Many telecommunications programs provide a "conference mode" where you type and edit line(s) of text in a window. When you press ENTER, the lines are sent through Delphi to the other users. If you are using such a conference mode, you may not want to see everything you type twice. If not, the /NOECHO command is for you. This is generally the second command I enter at the Conference> prompt. If you change your mind, /ECHO restores the echoing of each keypress. If you don't want to see what you type at all, use the /NOREPEAT command, you won't get Conference messages from yourself. These settings last only until you leave the Conference area. You need to enter them each time you enter Conference.

From Scratch

So, how do you create a new Conference group? At the Conference> prompt, enter

JOIN *groupname*

where *groupname* is a name not currently in use by another group. You see something like

```
Conference> join Hi Ho!
You have just created group "Hi
Ho!"
(Type Control-Z to exit back to
menu)
```

and you are now alone in a new Conference group. Doesn't sound like much fun, eh? What do you do? Well, you can /SEND messages to other people, and invite them to talk to you. (Actually, you can do this before creating the new group.) You can also use the /PAGE command. For example, entering

/PAGE RICKADAMS

sends a message to RICKADAMS telling him you want to talk with him in Conference. The /PAGE command also specifies the SIG from which you are sending the page.

If you receive a page from another user, you can use /REJECT to reject the page, or /ANSWER (or /ACCEPT) to answer the page. The latter commands bring you right into the same Conference group as the person who paged you. However, you must already be in Conference to use /ANSWER. If you change your mind, you can use /CANCEL to cancel all non-answered pages. When possible, it's a better idea to /SEND someone an invitation into a Conference. This allows you to ask a question or mention what you want to talk about.

To leave Conference, press CTRL-Z or enter /EXIT to get back to the Conference> prompt. Press CTRL-Z or enter /EXIT once more to return to the SIG prompt. As usual, enter /HELP if you need it. There are more slash commands available in Conference, so you will see a longer list if you enter /HELP while you are there. For more help, you can enter /HELP FULL.

Miscellaneous

A useful (and fun) Conference slash command is /GNAME, which you use to change the name of the current group. To change the group name Late Night Chat to Early Morning Talk, enter

/GNAME Early Morning Talk

One silly slash command (definitely not for use during serious meetings) is /FUDDLE, which befuddles everything you type. Type /FUDDLE ? to list all available befuddlements. For example:

```
/fuddle flu
New befuddlement is FLU
Hello there. I have a cold in th
e nose.
.Eddie> Hello dhere. I habe a go
ld in dhe node.
```

Another fun command is /ACTION, which generates a random saying. /NOACTION generates a string of several random sayings. Try them!

We'll take a closer look at other slash commands next month.

Database Information

In OS9 Online, Bruce Isted released a number of useful utilities and a powerful, multipurpose driver, VRN. Tim Kientzle posted *Help 2.0*, a huge help-file archive along with a *Help* program to call it. This help archive is quite useful for anyone, but you'll need a hard drive for storage. Tim also released *XYDown*, a stand-alone program that downloads using Xmodem and Ymodem batch protocols. Marie-Louis Marcoux contributed a new version of *dEd*, which makes it easier to edit a disk's CAT (Cluster Allocation Table). Mike Passer posted an IAPL interpreter for anyone who might be interested in this unusual and powerful language.

Francis Swygert's posting, *CoCo2IBM*, allows an IBM PC to read a Disk BASIC-formatted disk. If you use *Autoterm* and want to automate your use of Delphi, you'll want Carl Boll's *Autoterm KSM(s)*. Marty Goodman posted a bundle of information about the Hayes-compatible modem command set and register settings.

Conferences

Finally, let me mention the regularly scheduled conferences. All conferences occur at 10 p.m. EST:

Steve Bjork — Games Programming
First Monday every month
Tim Kientzle and Eddie Kuns — Using Delphi
Second Monday every month
Jeff Parker — The CoCo Publisher
Third Wednesday every month

In addition to these regularly scheduled conferences, Carl Boll (CBJ) has informed me that he's hosting two open conferences, one March 9 and the other March 24 at 10:30 p.m. EST. Feel free to drop in and chat! ❑

Database Report

OS-9 SIG

Utilities:

GEMINI PRINTER SETUP	
NITOR	Dale Wardwell
SLOW DOWN I/O	
BRUCEISTED	Bruce Isted
LINE INPUT FOR BASIC09	
BRUCEISTED	Bruce Isted
CHOP TEXT FILES	
BRUCEISTED	Bruce Isted
NEW ALGORITHM LF STRIPPER	
MATHOMPSON	Matthew Thompson
BFORMAT	
WJMOORE	Warren Moore
DELF.AR	
DAMIONGREY	Greg A. Jandl
DHRYSTONE BENCHMARK 'C' SOURCE	
BUDDCAR	Bob Palmer
DED_PLUS IPATCH	
MARLOU	Marie-Louis Marcoux
UNZIP VERSION 3.0	
PERFUMER	Newton White
HELP 2.0	
TIMKIENTZLE	Tim Kientzle

Device Drivers:

VIRQ RAM NULL DRIVER	
BRUCEISTED	Bruce Isted

Patches:

SERIAL MOUSE DRIVER	
BRUCEISTED	Bruce Isted
MMAP PATCH	
DOCBEAR	John Wesson
CUSTOM BOOT	
KINGTRENT	Mike Huskey

Telcom:

XYDOWN 1.1	
TIMKIENTZLE	Tim Kientzle

Graphics & Music:

CHRISTMAS CM3 PICTURES ARCHIVE	
R90S	Phil Mortensen
SVIEW	
SEBJMB	Jeff Blower
HOW OFTEN I HAVE CALLED YOU	
DFYE	Danny Fye
WHOLE LOTTA LOVE	
RAGTIMER	Mike Knudsen
BEATLES FOR UMUSE 3	
RAGTIMER	Mike Knudsen
JUKEBOX PLAYER FOR ULTIMUSE	
RAGTIMER	Mike Knudsen
PLAY ICON AND AIF	
BACKFIRE	Christopher Johnson
BEATLES.AR	
DFYE	Danny Fye
THANKSGIVING.AR	
DFYE	Danny Fye
PIANO INVENTION #1 BY BACH	
PDUNC	Paul Duncan
DOCTOR WHO	
DEANHOLDER	Dean Holder
LINGERIE GIF'S	
GRAPHICSPUB	Bob Montowski
BEATLES ALBUM COVER IMG	
DEANHOLDER	Dean Holder
3D FRACTAL FERNS	
MCRISWELL	Marty Criswell

Programmers Den:

IAPL INTERPRETER	
MPASSER	Mike Passer
SET GLOBAL MOUSE PORT/RESOLUTION	
MISHOO	Mike Shook
FILTER LF & CTRL	
BOBKEMPER	Robert Kemper

68K-OS9:

DHRYSTONE/WHETSTONE	
TJMARTIN	Timothy Martin

CoCo SIG

General Information:

COCO 3 CONSUMER INFORMATION	
TOMFANN	Tom Fann

CoCo 3 Graphics:

WHO.IMG	
TRAS	Richard P. Trasborg
ENTERTAINMENT TONIGHT "BREAST"S	
STEVEPDX	Steve Ricketts
MORE "MARRIED... W/CHILDREN"	
STEVEPDX	Steve Ricketts
IMGVUE2.BAS	
TRAS	Richard P. Trasborg
RAS3D10.BAS	
TRAS	Richard P. Trasborg
ANDREA.IMG	
JOHNHOHN	John Hohn
CALENDAR GALS IN IMG	
LDMOORE	Larry Moore
NEW STAR TREK SCANS, ISHARA YAR	
STEVEPDX	Steve Ricketts
MARRIED... WITH CHILDREN SCANS	
STEVEPDX	Steve Ricketts
COCO 3 GRAPHICS	
RICKFRANZ	Rick Franz
MORE DS69B 4096 COLOR NUDES	
STEVEPDX	Steve Ricketts
SOAP OPERA NUDES	
LDMOORE	Larry Moore
640 SLIDE VIEWER VER.2 AND PICS	
LDMOORE	Larry Moore
NADINE AND OTHER NUDES	
LDMOORE	Larry Moore
LINDA BLAIR NUDE	
LDMOORE	Larry Moore

Utilities & Applications:

COCO2IBM	
DSRTFOX	Francis Swygert
DIRLABEL.BAS	
MATTASHE	Matt Ashe
LOTTO80.BIN	
MISHOO	Mike Shook
BIORYTHMS/BAS	
JOHNALE	John Alexander
BOWLING STATS V5.1	
REDCOAT	Don Joyce

Games:

POP.ARC	
COSMONAUT	Steve Secord

Classic Graphics:

XMAS CARD	
BOBCAR	Bob Carson

Telecommunications:

AUTOTERM KSM(S)	
CBJ	Carl Boll
HAYES REFERENCE TABLES	
MARTYGOODMAN	Marty Goodman

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MORE DRUG LIES FROM BENNETT AND	
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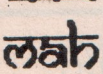

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ShellMate 2.2

ShellMate is the epitome of what a point and click file management system was meant to be. With ShellMate, you have access to commands such as copy, move, delete, rename, makdir and free at the touch of a button. It also gives you point and click access to the Public Domain picture display utilities VEFShow and GIFOS9, as well as the archive utility Ar.

The biggest benefit of ShellMate is that it allows you to manipulate large batches of files with one mouse click when either copying, moving, deleting or arcing. You can also easily move through simultaneously displayed Source and Destination directory trees by either double clicking on a subdirectory name, or clicking on the "Parent" command.

System Requirements (both programs)
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Lifeskills 7

by Fred B. Scerbo
Contributing Editor

Back in 1985 I started a series of six programs titled *Lifeskills*, which were computer simulations designed to help users react to real-life situations. It has been many years since I added any programs to the *Lifeskills* library. (I still use the original programs.) Therefore, now seems as good a time as any to add to that well-received series.

Lifeskills 7 is the filename used for this latest installment, and it attempts to familiarize users with checkbook skills. In some ways, it is similar to *Lifeskills 1* which dealt with subtraction skills. Instead, *Lifeskills 7* uses a combination of written and mathematical problems to simulate the skills needed for balancing a checkbook. I designed this program with up to nine skill levels that can be selected from the title card by pressing the corresponding numbers on the keyboard.

Another useful feature is the program's ability to give hints. After you choose your skill level, the following appears on the screen:

```
ALLOW HINTS (Y/N)?
```

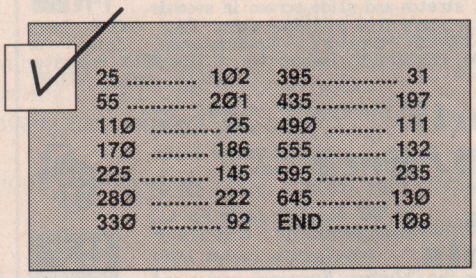
If the user presses Y, the program restates any math problem on the screen and indicates whether addition or subtraction skills are needed. If the user presses N, the program leaves it to the user to decide how the problem should be stated and which skills to use.

This program should be used with pen and paper available to help go through the problems manually as needed. This is not a program that balances a checkbook for you. Instead, it makes you go through the steps, teaching you to do it yourself. Let's face it, most of us probably already do this job by hand, even if we have a CoCo or another personal computer. Most programs I have seen that deal with checkbooks have been too much trouble to use regularly. *Lifeskills 7* is designed to teach skills that are lost by many youngsters in this age of pocket calculators.

When the problems actually appear on the screen, you are given a random account balance with which to work. Starting with the first problem, you are asked if you have enough money to purchase a certain item. If so, you go through the subtraction steps needed to deduct that amount from your checking account.

Once the amount in your account gets too low, you cannot purchase anything, but you must still answer the questions as to whether or not you have enough money in

16K Extended



The Listing: LIFESKL7

```
1 REM**************************
2 REM* LIFE SKILLS SIMULATION *
3 REM*    CHECKBOOK SKILLS     *
4 REM*    BY FRED B.SCERBO     *
5 REM*     6Ø HARDING AVE      *
6 REM*  NORTH ADAMS,MA Ø1247   *
7 REM*   COPYRIGHT (C) 199Ø    *
8 REM**************************
9 CLSØ
1Ø FORI=1TO32:PRINTCHR$(2Ø4);:NE
XT
15 FORI=1TO192:READA:PRINTCHR$(A
+128);:NEXT
2Ø FORI=1TO32:PRINTCHR$(195);:NE
XT
25 DATA93,88,96,93,88,84,94,92,9
Ø,93,92,93,,,126,124,122,125,,11
2,126,116,126,116,126,16,116,126
,,117,124,125
3Ø DATA85,,,85,,,9Ø,8Ø,88,85,,84
,,,122,,12Ø,117,16,118,16,,122,,
122,,16,122,,117,,116
35 DATA85,,,85,,,91,9Ø,96,85,83,
82,,,75,67,66,69,7Ø,16,,,74,,74,
,16,74,,69,67,67
4Ø DATA85,,,85,,,9Ø,88,,85,8Ø,,,
```

Fred Scerbo is a special needs instructor for the North Adams Public Schools in North Adams, Massachusetts. He holds a master's in education and has published some of the first software available for the Color Computer through his software firm, Illustrated Memory Banks.

your account. If you can't afford an item, you are asked how much, in addition to your current balance, is needed to make the purchase.

At this point, the program gives you checks to add to your checking account. Here's where the addition skills come into play. Once a working balance has been achieved, you may once again go on a shopping spree.

That's really all there is to it. The constant shifting of skills and questions keeps the program from getting boring too quickly. It also helps to ensure that this simulation actually reviews skills that are needed in everyday life.

You may check your score and progress at any time by pressing the @ key. Pressing C returns you to where you left off. A percentage grade score is given from the scorecard whenever you check it. ❑

```
,32,,74,69,68,66,,,74,,74,,16,74
,,,,69
45 DATA85,,90,85,,,90,,,85,,81,,
16,42,,42,37,,36,34,,42,,42,37,1
6,42,37,37,,37
50 DATA87,83,90,87,82,81,91,80,,
87,83,87,,,43,35,42,39,34,32,43,
33,43,33,43,39,33,43,39,37,35,39
55 PRINT@293," COMPUTER  SIMULAT
ION ";
60 PRINT@325,"   CHECKBOOK SKILL
S   ";
65 PRINT@357,"   BY FRED B.SCERB
O   ";
70 PRINT@389,"  COPYRIGHT (C) 19
90  ";
75 PRINT@453,"  SKILL LEVEL  (1-
9)  ";
80 X$=INKEY$:IFX$=""THEN80
85 W=VAL(X$):IFW=0THEN80
90 PRINT@453,"  ALLOW HINTS? (Y/
N)  ";
95 X$=INKEY$:IFX$="Y"THEN110
100 IFX$="N"THEN115
105 GOTO95
110 DL=1:GOTO120
115 DL=0
120 CLS0
125 Z=500
130 DIMB$(10):FORI=1TO10:READB$(
I):NEXT:X=RND(-TIMER)
135 CLS0:Q=RND(10)
140 FD=0
145 X=INT(RND(Z))*W*2:A=X/100
150 Y=INT(RND(Z))*W*2:B=Y/100
155 CL=INT(RND(15)/2)
160 N$="##.##"
165 CLS0:PD=PD+1:PR=1
170 GOSUB460:PRINT" YOU HAVE A B
ALANCE OF ";:PRINTUSING"$##.##";
A:PRINT" IN YOUR CHECKING ACCOUN
T."
175 PRINT" THE ";B$(Q);" YOU WAN
T COST";:IF W>1THENPRINT" A"
180 IF W=1THENPRINT"S A"
185 PRINT" TOTAL OF ";:PRINTUSIN
G"$##.##";B;:PRINT". DO YOU HAVE
"
190 PRINT" ENOUGH MONEY TO BUY T
HE NEW"
195 PRINT" ";B$(Q);
200 PRINT" ?  (Y)ES OR (N)O"
205 GOSUB460
210 X$=INKEY$:IFX$=CHR$(3)THEN21
0
215 IFX$="N"THEN250
220 IFX$="Y"THEN235
225 IFX$="@"THEN465
230 GOTO210
235 IF A>B THEN PRINT" CORRECT!
YOU HAVE ENOUGH.":CR=CR+1
240 IF B>A THEN PRINT" SORRY! YO
U NEED MORE MONEY.":WR=WR+1
245 GOTO260
250 IF A>B THEN PRINT" SORRY! YO
U HAVE ENOUGH.":WR=WR+1
255 IF B>A THEN PRINT" CORRECT!
YOU NEED MORE MONEY.":CR=CR+1
260 GOSUB460
265 IF B>A THEN 305
270 PRINT" HOW MUCH MONEY WILL Y
OU HAVE":PRINT" LEFT?";
275 IFDL=0THEN285
280 PRINT" (";:PRINTUSINGN$;A;:P
RINT"-";:PRINTUSINGN$;B;:PRINT")
";
285 PRINT"=> $ ";
290 GOSUB340
295 IF INT(C*100000+.5)=INT((A-B
)*100000+.5)THEN400
300 IF INT(C*100000+.5)<>INT((A-
B)*100000+.5)THEN420
305 PRINT" HOW MUCH MORE MONEY D
O YOU":PRINT" NEED? ";
310 IF DL=0THEN320
315 PRINT"(";:PRINTUSINGN$;B;:PR
INT"-";:PRINTUSINGN$;A;:PRINT")"
;
320 PRINT"=> $ ";
325 GOSUB340
330 IF INT(C*100000+.5)=ABS(INT(
(B-A)*100000+.5))THEN410
335 IF INT(C*100000+.5)<>ABS(INT
((B-A)*100000+.5))THEN430
340 Y$=""
345 X$=INKEY$:IFX$=""THEN345
350 IFX$=CHR$(13)THEN385
355 IFX$=CHR$(8)THEN375
360 IFX$="@"THEN465
365 IF ASC(X$)<13THEN345
370 Y$=Y$+X$:PRINTX$;:GOTO345
375 WW=LEN(Y$):IFWW=0THEN340
380 PRINTX$;:Y$=LEFT$(Y$,WW-1):G
OTO345
385 C=VAL(Y$):IFLEN(Y$)=0 AND X$
=CHR$(13)THEN340
390 PRINT:GOSUB460
395 RETURN
400 PRINT" CORRECT! YOU HAVE ";:
PRINTUSING"$##.##";C;:PRINT" LEF
T.":CR=CR+1
405 GOTO435
410 PRINT" CORRECT! YOU NEED ";:
PRINTUSING"$##.##";C:CR=CR+1
415 NM=1:GOTO435
420 PRINT" WRONG! YOU HAVE ";:PR
INTUSING"$##.##";A-B;:PRINT" LEF
T.":WR=WR+1
425 GOTO435
430 PRINT" WRONG! YOU NEED ";:PR
INTUSING"##.##";B-A:WR=WR+1:NM=1
435 GOSUB460:PRINT" PRESS <<<ENT
ER>>> TO CONTINUE.";:POKE1535,96
:FORI=1TO300:NEXTI
440 FD=1
445 X$=INKEY$:IFX$=CHR$(13)THEN5
45
450 IFX$="@"THEN465
455 GOTO445
460 SQ=(143+(CL*16)):FORQS=1TO32
:PRINTCHR$(SQ );:NEXTQS:RETURN
465 CLS:PRINT:PRINT:PRINT
470 PRINTTAB(3)"PROBLEMS COMPLET
ED  = "PD:PRINT
475 PRINTTAB(3)"CORRECT RESPONSE
S   = "CR:PRINT
480 PRINTTAB(3)"INCORRECT RESPON
SES = "WR:PRINT
```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- International characters (Enter 37 international characters from the keyboard.)

Enter commands in lower case
Use disk while in FAST mode
Simple one-key FAST/SLOW mode switch.
Many minor CoCo III errors are corrected, and many more minor enhancements are made and explained in the documentation.

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Blackjack III 512k

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Each scene is constructed of a great number of images, composited to form a single frame in much the same way that animators form a frame of an animated film. This special technique allows unprecedented realism.
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$40.00 512k CC3, 40tk Drive req.

Send check or money order to:
Robert Offermann
2447 Oak Park Way
Orlando, FL 32822

```
485 TR=CR+WR:IFTR=0THENTR=1
490 SC=INT(CR/TR*100)
495 PRINTTAB(3)"YOUR TOTAL SCORE
    = "SC"%":PRINT
500 PRINTTAB(3)"ANOTHER TRY (Y/N
) OR (C) ?";
505 X$=INKEY$:IFX$=""THEN505
510 IFX$="Y"THEN RUN
515 IFX$="N"THEN CLS:END
520 IFX$="C"THEN 530
525 GOTO505
530 PD=PD-1:IF FD=0 AND PR=1 THE
N 165
535 IF PR=2THEN560
540 IF FD=1 THEN 135
545 IF NM=0THEN A=A-B:GOTO150
550 IF A-B<=0THEN A=A ELSE A=A-B
555 Y=INT(RND(Z))*W*2:B=(Y/100)+
2
560 CLS0:PD=PD+1:PR=2
565 GOSUB460:PRINT" YOU HAVE A B
ALANCE OF ";:PRINTUSING"$##.##";
A:PRINT" IN YOUR CHECKING ACCOUN
T."
570 PRINT" YOU HAVE JUST RECEIVE
D A CHECK"
575 PRINT" FOR ";:PRINTUSING"$##
.##";B;:PRINT". HOW MUCH"
580 PRINT" WILL YOUR NEW BALANCE
 BE ?"
585 GOSUB460
590 PRINT" RECORD YOUR NEW BALAN
CE HERE.":IF DL=0THEN600
595 PRINT" (";:PRINTUSINGN$;A;:P
RINT"+";:PRINTUSINGN$;B;:PRINT")
";
600 PRINT"=> $ ";
605 GOSUB340
610 IF INT(C*100000+.5)=ABS(INT(
(A+A)*100000+.5))THEN620
615 IF INT(C*100000+.5)<>ABS(INT
((A+B)*100000+.5))THEN630
620 PRINT" CORRECT! YOU HAVE ";:
PRINTUSING"##.##";C:CR=CR+1
625 GOTO635
630 PRINT" WRONG! YOU HAVE ";:PR
INTUSING"##.##";A+B:WR=WR+1
635 GOSUB460:PRINT" PRESS <<<ENT
ER>>> TO CONTINUE. ";:FORI=1TO30
0:NEXTI
640 NM=0:FD=0
645 X$=INKEY$:IFX$=CHR$(13)THEN6
60
650 IFX$="@"THEN465
655 GOTO645
660 CLS0:Q=RND(10)
665 FD=0
670 A=A+B
675 Y=INT(RND(Z))*W*2:B=Y/100
680 GOTO150
685 DATA SHIRTS,CANDIES,SOCKS,DI
SKS,BOOKS,PADS,PENS,CARPETS,SUNG
LASSES,TAPES
```


Novices Niche

Music Grid

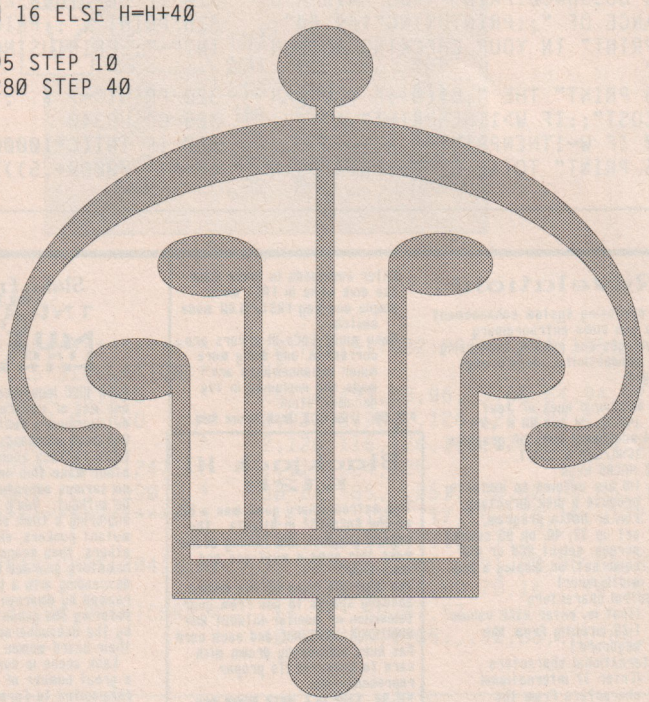
by Tim Hennon

If you've ever seen *Close Encounters of the Third Kind*, you may remember the scene where the humans talk to the aliens using different musical tones while at the same time flashing differently colored lights on a board. This program creates a similar effect. To see what I mean, enter the program and save it. Then enter RUN "MUSCGRID".

A white grid is drawn on the screen. The boxes are filled one at a time, left to right, with one of eight different colors. Each color is accompanied by a specific sound. Eventually, all the boxes will be white. When the program runs across a white box, it skips a tone. You'll see, and hear, what I mean when you run the program. To stop the program, press the BREAK key.

The Listing: MUSCGRID

```
0 'MUSIC GRID
** WRITTEN BY TIM HENNON
1 'COPYRIGHT (C) MARCH 1991
** BY FALSOFT, INC.
2 'RAINBOW MAGAZINE
3 HSCREEN 2
4 HCLS 8
5 C=4
6 V=30
7 HCOLOR C
8 HLINE (20,V)-(300,V),PSET
9 IF V=100 THEN 11 ELSE V=V+10
10 GOTO 7
11 H=20
12 HCOLOR C
13 HLINE (H,30)-(H,100),PSET
14 IF H=300 THEN 16 ELSE H=H+40
15 GOTO 12
16 FOR V=35 TO 95 STEP 10
17 FOR H=40 TO 280 STEP 40
18 C=RND(8)-1
19 HPAINT (H,V),C,4
20 SOUND (C*25)+5,2
21 NEXT H
22 NEXT V
23 GOTO 16
```



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Fighting back against barely sufficient synthesizer designs

MIDI Mods

by Cecil C. Houk

I bought my first MIDI synthesizer in 1986 and now (somehow) I have 13 of them. The first of these was a Yamaha DX-100. At that time I used a 64K F-board CoCo 1 and a 64K CoCo 2. There was never a problem using *Lyra* with these combinations (with the serial I/O port for MIDI OUT). A few months later I picked up a Casio CZ-230S and discovered I could not connect it to the CoCo 1 without getting a lot of MIDI errors. There were no problems with the CoCo 2 and CZ-230S combination.

To make a long story short, I discovered there was no problem if I made a chain of synthesizers with the DX-100 first in line. I added more synthesizers over the following months and had only an occasional stuck note on the CZ-230S. This configuration is not recommended by most MIDI experts, but I have successfully used it with both the CoCo and PC-compatible systems.

Two weeks ago, a friend brought his new Kawai K1r to me in hopes I could figure out how he could use it with his other MIDI equipment. When I connected it between the Roland MPU-IPC (the industry standard for PC-compatible MIDI interfaces) and the DX-100, all sorts of strange things happened. The DX-100 de-tuned. My CR-1000 Digital Drummer shut off in the middle of a song. The K1r produced several stuck notes. All of these things seemed to occur randomly. When I reversed the position of the DX-100 and the K1r in the chain, operation improved, but was not 100 percent correct. When I connected the chain of synthesizers to my CoCo 3, the result was almost 100-percent correct operation.

Cecil Houk, the owner of Rulaford Research, started making music with CoCos in 1983. Having discovered the world of MIDI in 1985, he now has more than 12 synthesizers. He can be contacted at 3687 Rosa Linda Street, San Diego, CA 92154, (619) 690-3648.

Having an inquiring mind, I connected an oscilloscope to various points in the equipment to see what was going on. With the K1r connected to the MPU-IPC, there was serious ringing on the MIDI OUT signal of the MPU-IPC. This did not occur with the DX-100 connected to the MPU-IPC. I examined the circuitry in all my synthesizers and interfaces and discovered the following:

1. The Roland MPU-IPC uses an open-collector, Hex-inverter IC for the MIDI OUT and Sync circuits — without a pull-up resistor. Not good! Every data sheet for this type of IC clearly states that a pull-up resistor is required for proper operation. I discovered similar omissions on the MIDI THRU circuits in many other synths.

2. Kawai has put incorrectly tuned RFI filters on the MIDI IN, MIDI OUT, and MIDI THRU signal lines of the K1, K1m, K1r, and K1 II.

When these situations are combined, the result is that false start signals are generated. This causes all manner of problems, including stuck notes and false control commands. The bottom line is you cannot use a Kawai K1 series synthesizer with the Roland MPU-IPC — unless you change a few things first.

We are quite fortunate that there are pin-for-pin replacement ICs available that will eliminate most of the problems with MIDI. For years, the opto isolators in the MIDI circuits have been blamed for the problems encountered when chaining synthesizers. They aren't the culprits. The problem is the use of open-collector circuits without the mandatory pull-up resistors. It's no wonder these devices don't work the way they were intended.

Down to the Fix

As we look at the methods I found to correct the problems, bear in mind opening your synthesizer voids the warranty in most cases. Most manufacturers prohibit user alterations to the circuitry. Neither I, nor THE RAINBOW, assume any liability for damage resulting from the modifications outlined in this article.

In the Roland MPU-IPC, remove IC12 (a 74LS03) and replace it with a 74LS14. Also, remove R38, R39 and R40 (4700 ohm). While you are at it, put a jumper from Pin 5 of IC12 to Ground. This eliminates a "floating" gate condition in the unit.

For the Kawai K1/K1M, remove IC U25. From the K1 II, remove IC U10. Remove IC2 from K1r. This is a 74LS03, which should be replaced with a 74LS132. Also, remove all the RFI filter components in the circuit.

In the Casio CZ-230S, the 74LS04 should be replaced with a 74LS14. Remove all the RFI filters (including the two C101 capacitors). Add a 220-ohm resistor in series with Pin 1 of the PC900 and the MIDI IN jack.

In the Roland MT-32, IC25 (a 74HC04) should be replaced with a 74LS14. Three of the gates in IC25 are not used. Two of these gates can be used to replace Q6 and Q7. But this is *not* a job for novices. If you are a skilled hacker, though, you should be able to take care of this.

Because IC2 cannot be changed to a Schmidt Trigger in the Yamaha FB-01, pull-up resistors should be added to pins 4 and 10. Use a value of approximately 1K.

If I didn't mention your particular synth, it isn't because there isn't a problem. Many other synthesizers need correcting, and I hope to provide more information in the future.

If you encounter problems in making these modifications, or if you have a problematic synthesizer not mentioned, leave a message for me on the Rulaford Research MIDI BBS and I'll try to help. To contact the BBS, call (619) 662-2428. The modifications I have described here are intended to correct design problems in the MIDI THRU ports on commercial equipment.

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First Prize

Having recently moved some 20 miles from North Ridgeville, Ohio, to Strongsville, my life is packed away in a hundred or so cardboard boxes. This means it takes me 20 minutes to find my stapler and another 20 to find the staples. I thought I had everything reasonably planned out. I connected my CoCo 3 system and everything looked good. When I turned the power on, the Read/Write light on my hard drive came on. (Uh, oh!)

I stopped backing up my hard drive some time ago (the procedure used more than 80 disks and took hours.) I quickly realized I wouldn't be running OS-9 for a while. It was a good time to get a Disk BASIC program to review for THE RAINBOW.

First Prize, by Zebra Systems, Inc., produces diplomas, certificates, licenses, awards, and similar official looking documents. *First Prize* runs on either a CoCo 1 or 2 with 64K or any CoCo 3. You must also have a mouse or joystick and a compatible dot-matrix printer. I used a CoCo 3 with an older-style Radio Shack joystick and an Epson FX-86E. *First Prize* is not copy-protected (thank you Zebra Systems) and you are encouraged to make a backup. It can use up to four floppy drives and employs Zebra Systems' graphics user interface. The program is very easy to use — creating documents requires little effort.

Although *First Prize* comes on a set of 10 disks, nine of the disks contain the template files that are used to create documents. If you spend any time with the users manual, read the brief section about templates. Understanding the components of templates is essential to effectively use *First Prize* since you build documents by assembling the various parts of a template. You cannot preview a complete document on the screen. You must print the document (design) to your printer to review your work in progress. However, this is not a big drawback.

Templates have six parts as follows:

1. Borders — you can select from a dozen or so.

2. Title — many of the 100 templates already have titles. You can design others yourself.

3. Artwork — I'm not sure why artwork is considered a separate part. Either there is artwork in a given template, or there isn't. You don't do anything with this part and cannot design your own artwork. Plenty of artwork is already provided in the 173 templates.

4. Body Text — enter anything you can type in seven lines. You can also pick from the five fonts included.

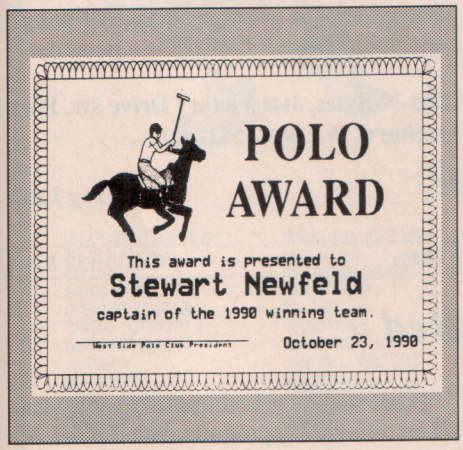
5. Signature Line — this is the text that is to appear below the signature line.

6. Date line — enter the date to be printed on the document.

A printed template directory contains references to the 173 templates. The directory shows pictures of all templates and is essential to using the program because the template files are numbered T101-T825. With descriptive filenames like that, you'll spend a long time loading and printing the indi-

vidual template files if you lose the directory. (Maybe this is some new form of copy protection.) My advice is to keep the directory in a safe place.

The documentation consists of a 60-page template directory and a 35-page users manual. The users manual is well-written and has plenty of helpful illustrations. If you're already familiar with *Label Designer*, you probably won't need to spend much time with the users manual, though.



First Prize is available for $49.95, plus shipping and handling. When you consider that many software companies charge $8 to $20 for accessory disks, the nine you get free from Zebra Systems make *First Prize* a first-rate product.

I'd like to say something about Zebra Systems' customer service, but *First Prize* never gave me any reason to call them. The program works flawlessly and its graphic interface makes using it natural and logical.

If you need, or want, to produce official looking documents try *First Prize*. It is another excellent bit of programming by Jeff Street, author of *Label Designer*. I do not find fault with the program except that it does not permit previewing completed documents before printing them. I think *First Prize* is very useful. However, I didn't expect that when I gave my secretary a Secretary of the Month award, she'd ask me for a raise. Thanks a lot Zebra Systems!

(Zebra Systems, Inc., 121 S. Burrowes Street, State College, PA 16801; 814-237-2652; $49.95, plus $3 S/H)

— Ernest F. Zore

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Utility OS-9

Math.1 Library

The *Math.l* package from Bits-n-Bytes is a relatively complete math library for the OS-9 C compiler, and it includes most trigonometric functions. The disk includes the complete *Math.l Library*, five sub-library modules that can be used to create custom libraries, and shell scripts to assist you in building custom libraries. All of the relocatable object files are also included in case you want to build a custom library consisting of one or more modules from each component library.

The trigonometric functions supported include the basic cosine, sine, and tangent. To that it adds secant, cosecant, cotangent, arcsecant, arcsine, arctangent, arccosecant, arccosine, and arccotangent. It also supports the hyperbolic versions of all of these functions. Other functions include factorial, square root, natural logarithm and Base-10 logarithm, power and Base-10 power, sign, double absolute value, a random number generator, truncation and rounding. An oddity here is that `ln()` finds the natural logarithm and `log()` handles Base-10 logarithms, which is the standard for mathematicians. However, the standard among most math libraries is that `log()` finds the natural logarithm and `log10()` finds Base-10 logarithms. Be aware of these differences. It would also help if more intuitive function names were used in several of the functions. For example, the cosecant function could have been called `cosec()` instead of `csc()`.

The *Math.l* package from Bits-n-Bytes is a relatively complete math library for the OS-9 C compiler.

An obvious omission from the package is a header file to prototype each of the functions included in the library. This is particularly troublesome since the C compiler assumes all functions return an integer value unless explicitly told otherwise. By default the compiler either automatically casts the value returned to a signed integer, or assumes the value returned is an integer and thereby returns seemingly random garbage if the actual function returns values of type `float` or `double`. Unfortunately, the author implies in the examples that you will manually type the prototype, or function declaration, for each function in every program you use. As an alternative, I suggest the author include a `math.h` file with the function prototypes in the `DEFS` directory in a future revision.

The manual is confusing in certain instances and seems thrown together in a random manner (with no index). You spend most of your time trying to locate each function in the manual rather than actually programming. The material in the manual *is* broken into logical sections (General Math Functions, Basic Trigonometric Functions, etc.), but locating a specific function is difficult without the aid of an index. Some of the functions, such as `red_root()`, are documented in such a way as to make you wonder if the function is included in the library or you are supposed to enter the source code provided to emulate the function. However, the global variable list for the `sqrt()` function on the previous page shows that it *is* included in the library. The manual does provide a lot of useful information, including a list of external references, the amount of memory required for code and data, and an example of each function. Even so, I think the author could have spent a little more time organizing and formatting the manual to make it more readable.

The only real problem I ran into with the *Math.l Library* is that each function causes your program to exit abruptly if an error is detected. No error-checking option is given. You either check the values to make sure they are in the proper range before calling the trigonometric functions, or take your chances. I had always assumed that the programmer had the responsibility for deciding how to handle errors. Well, that's definitely not the case in this library.

The results generated by each of the functions are accurate according to my calculator. One confusion factor to be aware of is that many formulas given in the manual *appear* incorrect. For example, the manual appears to state that the formula for calculating the secant is `1+cos(x)`. Fortunately, this is a case of mistaken identity. If you use a magnifying glass you will discover that a mathematical division symbol is used, even though it looks strikingly similar to a plus sign. In other sections of the manual, a slash is used to denote division. The manual also uses a lowercase x for multiplication instead of an asterisk, perhaps just to keep you on your toes. Well, there's something to be said for standardization and easy-to-read manuals.

Obviously a C library is not standard fare for the average computer user. But if you need a math library, and you take into consideration the caveats listed here, this package should get you going. All things considered, *Math.l Library* is a good deal.

(Bits-N-Bytes, 4140 Victory Drive SW, Port Orchard, WA 98366; $27.42)

— Greg Law

Utility CoCo 1, 2 & 3

Bed

What would you think of if you were asked to review a program called *Bed*? All kinds of ideas went through my mind. Thoughts of some sort of sexy game were at the top of the list. Well, I was surprised to find that *Bed* is actually a neat binary-editor, disk-utility program that allows the user to change the contents of and repair a crashed disk.

Bed works on any CoCo equipped with a disk drive. It's not copy-protected, so you can make a backup for safekeeping. The program does not require many instructions on its use. Be cautious, however, because it's easy to destroy a file or program if you don't know what you are doing. *Bed* is for experienced users who understand sectors, granules, and file allocation tables.

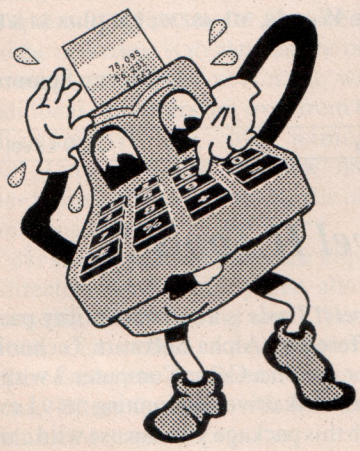
Loading and running *Bed* is a snap. You are presented with a menu of available options:

R — reads a sector after entering the track and sector numbers.

E — allows you to edit the disk contents in ASCII, Decimal, or Hex. Use the up and down arrows to reach the desired sector.

D — displays a sector, but does not allow you to edit. It's best to use this feature when exploring, so you can't harm the disk contents.

Add UP These Public Domain Values!



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PLEASE CIRCLE
TAPE DISK

W — writes your changes to the disk. You can also make a hard copy if you have a printer. This is recommended before you do any editing so you can go back and make corrections if needed.

F — searches the disk and finds bad sectors. This is a very powerful feature that helps you fix a crashed disk.

As always, it's best to make a backup of the original disk and use the backup to do the actual editing and writing. Since this is not always possible with a crashed disk, the author provides some neat tricks you can try. A fairly simple explanation of disk data storage is provided in the instructions. Using this information as well as reading other publications on how the CoCo disk system works can provide some excellent training, thus giving even a novice user valuable knowledge.

Bed is a powerful disk-editing and repair utility that I recommend. It does just what it's supposed to do without a lot of fanfare. The onscreen displays are uncluttered and easy to read.

(Robert W. Ruedy, 129 Prairie, Verdon, IL 62690; $13.95, plus $2.95 S/H)

— Robert Gray

Amateur Radio	CoCo 3

CC3FAX

CC3FAX is a radio-facsimile (fax) receiving program written for the 512K CoCo 3 with a disk drive and two-button joystick. Obviously, you also need a shortwave radio receiver capable of receiving facsimile signals. Such a receiver is suitable if it can receive SSB (Single Side Band) or CW (Continuous Wave, or Morse Code) transmissions. The receiver must be very stable to prevent frequency shift and subsequent picture distortion.

Generally, solid-state shortwave and amateur-radio receivers are excellent for this purpose. Hookup and operation are as simple as attaching the speaker or headphone output of the short wave receiver to the cassette (black) plug of the CoCo 3. The Main menu appears when you load and run `CC3FAX.BAS`. The 80-column screen shows the menu with these options:

1 Run fax program
2 Enable 40-track
3 Get instructions
4 Exit program

The fax program screen is similar to the *WEFAX* program published in THE RAINBOW (February 1985, Page 42). Notable exceptions are the ability to clear the video screen, a `SOUND` command, and easier to understand View and Load options. As with *WEFAX*, all onscreen commands are selected with the joystick using the point-and-click method. The `CLEAR` command is helpful when you want to clear all of the graphics from memory. This prevents getting fragments of old pictures mixed in with new images. The `SOUND` command turns on your video monitor speaker so you can hear the level of audio coming into the cassette port. This is helpful in those cases when plugging into the radio receiver's headphone jack disconnects the set's internal speaker. Other options include the selection of 60, 90 or 120 lpm (lines per minute). You can also select either the upper or lower sideband if you are not sure which one the fax station uses. However, virtually all fax transmissions are sent in the upper sideband. Interstation interference may be less on the other sideband. *CC3FAX* flips white and black based on your sideband selection, so received colors are correct. Also, post-reception noise filtering (light or heavy) can be used to clean noisy images. This is especially helpful to users who live in the center of the United States where reception of U.S. Navy faxs is problematic.

Unlike *WEFAX*, which displays fax images on `PMODE 4` screens, *CC3FAX* receives in the CoCo 3 Hi-Res mode. Although my finished printed copy is no different, the onscreen image is much better with *CC3FAX*. The full image is equivalent to 60 `PMODE 4` screens. You can move the joystick over the entire image, but you can't see it all at once onscreen. [*Editor's Note: The author has told us that Version 2.0 allows you to view the entire multi-screen image in a condensed form on a single screen. This lets you get an overview image, although it is necessarily distorted.*] Pressing the second joystick button allows you to toggle between pixel resolutions of 256-by-225 and 640-by-225, making larger images easier to see. A command for printing the image is also available. A command is included to reverse the image. I do this when there is a lot of black in the image; this saves quite a bit of ink in the printer ribbon.

CC3FAX also incorporates a 40-track disk option. Using this option allows you to save all of the fax image if you have a double-sided drive. Such a disk can store 1920 lines or 16 minutes of data at 120 LPM. Single-sided disks work fine, but can only store about half of the larger images.

The operating instructions, including popular fax frequencies, are included on the disk and can be read onscreen or sent to a printer. Operation is fairly simple, but first-time users may encounter some problems due to unfamiliarity with fax transmissions. Once you get used to fax, you will be hooked. *CC3FAX* is a fine program if you are interested in expanding your use of the CoCo. Shortwave listeners (SWLs) and amateur radio operators (hams) will be delighted with it.

(Robert Gault, 832 N. Renaud, Grosse Pointe Woods, MI 48236; $29 plus $4 S/H)

— Jerry Semones

Utility	OS-9 Level II

Level II Tools

Level II Tools is a software utility package offered by Alpha Software Technologies for use on a Color Computer 3 with at least one disk drive and running OS-9 Level II. With this package you can use wild cards with the `copy`, `del` and `attr` commands. You can also map your directories, and take control of color manipulation and window functions. This package includes filters to convert text files from uppercase to lowercase and vice versa, and an assortment of other utilities.

OS-9 has always lacked the convenience of wild cards. Wild cards provide the ability to specify partial filenames using the meta-character *. For example, if I want to copy all filenames in a specific directory with the extension `.c` from my hard drive to a floppy, I must type each filename in a `copy` command line. With the `wcopy` wild-card command, I need only enter

```
wcopy /h0/C_programs/*.c /d0
```

All filenames with the extension `.c` are then copied from the `C_PROGRAMS` directory on the hard drive to the floppy.

The four wild-card commands included are `wcopy`, `wdel`, `wattr` and `wmatch`. These commands are similar to `copy`, `del`, `attr` and `dir`, respectively. Each wild-card command performs flawlessly. I had only one slight "problem" with these commands — the ability to wipe out an entire group of files by accidentally typing `wdel *`. While the documentation warns you several times that you could wipe out an entire directory this way, there should be some type of confirmation when you specify all filenames by typing the meta-character by itself.

`wdel` and `wmatch` are stand-alone programs, while `wcopy` and `wattr` require `copy` and `attr` and fail if they are not present in your execution directory.

The directory structure commands allow you to map your directories and sort filenames. `otree` and `dtree` allow you to build a road map of your directories. `otree` graphically represents the directories on a device, such as your floppies or hard drive. `dtree` allows you to specify just a subdirectory with the option of including filenames. Both commands work fine, except for one small problem with `dtree` when you use the `-f` option. If a directory or file is renamed, and the new name is shorter than the original, `dtree` gives you the new name with the additional characters left over from the old filename. If the old name was `real_long_name` and the new name is `short_name`, `dtree` reports the file name as `short_namename`.

`dirsort` is just what its name implies—a directory-sorting utility that allows for ascending or descending sorts. There is an option that makes subdirectories have uppercase letters and filenames have lowercase letters for those who want to stay within OS-9 standards.

Four color-manipulation commands are included in the utility package. They allow for quick changes of the foreground, background and border colors, and any of the palette registers. Simply type the command followed by a decimal number. No need to use the `display` command included with OS-9, which requires you to use hexadecimal codes.

With *Level II Tools* you can use wild cards with the copy, del and attr commands.

Three window-handling commands allow you to change the current window type, and open and close an overlay window. The `wconfig` command uses a syntax similar to the `wcreate` command, except it allows you to change a window that is already defined. The `window` command pulls up an overlay window complete with border and optional title. The `wend` command ends an overlay window created with the `window` command. Both `window` and `wend` can be used in command files to create impressive displays.

The `upcase`, `locase` and `dislex` commands are used to alter text files. `Upcase` converts all lowercase characters in a file to uppercase, while `locase` converts all uppercase characters to lowercase. `dislex` produces, literally, a mirror image of a file. I can see a use for `upcase` and `locase`, but few uses for `dislex`. The manual, however, mentions file encryption or just plain fun.

Two command-file commands, `goto` and `pause`, are also included. These are useful in procedure files to pause the screen with a message and to repeat a section of the file. `goto` is limited in that there is no way to conduct conditional testing.

The remaining six tools are listed as utility commands. `ascii` converts any character to its proper ASCII value. `convert` allows you to perform base conversions between decimal, binary and hexadecimal. `devname` returns the name of the current device associated with a device or file. Under OS-9 Level II, `devname` is useful for reporting the current window being used. `calendar` is a simple reminder program

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that allows you to update or list current reminders.

With browse, you can look through a text file using the arrow keys to scroll forward and backward. Since browse uses a fixed buffer, it cannot read more data than the size of its buffer. This makes the program good only on files equal to or smaller than the size of its buffer. The remaining command is mmap which prepares a graphic map (using Xs and Os) of the memory in the computer.

The manual included with this package is 30 pages long. It shows the proper syntax for each command along with some examples. There is an introduction by the author along with installation procedures for moving the utilities to your working floppies or hard drive.

The package contains 25 utilities for a cost of $24.95. This amounts to just under a dollar per utility. Given the limitations of some utilities and the cost per utility, this package is a fair bargain.

(Alpha Software Technologies, 210 Bluefield Drive, Slidell, LA 70458; 504-649-5176; $24.95, plus $3 S/H)

— Carmen Izzi, Jr.

Game CoCo 3

Caveman

In the year 2061, after the great war had decimated the human race, only a few pockets of humanity survived. Among those people were Evil Lord Dracus and a sage named Kubai. Lord Dracus is now busy repopulating the world with Robodroids, creatures half human and half machine, which threaten the few remaining villages. This world is without leadership and on the brink of chaos. It is felt that only Kubai can lead the remnants of mankind back to a civilized life. Unfortunately, Dracus had Kubai kidnapped and it is up to you, who seek adventure, to locate Kubai and return him to the village.

That is the scenario, but let's look at the actual game. *Caveman* is of the platform-arcade genre in which you play the warrior who has to work his way from one side of the screen to the other by jumping or reaching various plateaus and exiting each of 20 game screens. To impede your progress, mines are placed throughout each cave. Some of these mines are in plain sight while others are invisible. There are three ways to rid passages of mines. One is to drop one of 60 pieces of dynamite onto the mines. The second is to simply stomp on a mine. And the third way is to run into it. The last method, however, causes your warrior damage or death and is not recommended.

Caveman is of the platform-arcade genre in which you play the warrior who has to work his way from one side of the screen to the other by jumping or reaching various plateaus.

There are keys, piles of gold, bottles of magic potion, and mystery treasure chests scattered throughout the caves. The gold adds energy points, which are the warrior's health indicators. Each warrior starts off with 10 energy points and must forfeit one of his four lives should that energy reach zero. Potions allow the warrior to see the hidden mines, but only for a split second. Treasure chests either deduct or add energy points. While mapping is not really necessary, you may want to note where each door in the later stages leads, as some take you back to previous screens.

Caveman is a machine-language game that requires a CoCo 3 and a joystick, preferably the two-button type. The game comes on two flippy disks (that is, two disks and four sides). Disk switching is necessary throughout the game. The graphics are fair, although not crisp or very detailed. An RGB monitor is recommended. Play is easy and relaxing as the game is not timed and there are no moving objects to contend with.

There are a few minor items that could improve the game. While it does not effect play, it would be helpful to have each cave or level displayed on the screen so players know how much progress has been made. A final screen listing points, previous scores, and how far a player has gone when the game ends would also be a nice touch. Randomizing the location of keys, mines, and gold would improve the game — each game would then be a new adventure. So, if you are looking for a fast-paced, shoot-'em-up game, *Caveman* will be a disappointment. However, if you often do not get past the first screen with other games, this will be a joy. It can be successfully completed within an hour.

(J.T. Rawlinson Software, #361 St. Germain Ave., Toronto, Ontario M5M 1W6 Canada; 416-782-2217 evenings only; $14.95 plus $3 S/H)

— George Aftamonow

Music CoCo 3

SoundTrax Instrument Disks

I recently reviewed *SoundTrax*, a sound-sequencing program for the CoCo 3 from Sundog Systems (January 1991, Page 76). On the back of the *SoundTrax* program disk are several instrument and sound files from which to pick and choose.

Although there were a few dozen of these voices to use in recordings, their scope was somewhat limited. For instance, the guitar voice sounded good, but its one octave range was restricting. Similarly, the drum samples sounded a bit stale after hearing the exact same thud or cymbal crash over and over. What the program needed was a wider variety of samples.

Sundog Systems has come to the rescue with supplemental instrument-set disks. There are three different sets, each with approximately 40 sound samples. Each set comes on one "flippy" disk. These are not stand-alone programs — you do need the *SoundTrax* program to use them.

One criticism I have is that related instrument samples aren't all on the same set. If your favorite instrument is the piano you need to buy sets one and three. If you're laying down a drum track and doing drum rolls, then decide you'd like to use the open and closed hi-hat sounds, you'll find the samples are on two different sets. How about some organization? Put all drum voices on one disk, all voices for piano on

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one disk, and scatter miscellaneous sounds throughout. Of course, if you buy all three sets you can configure your instruments any way you deem fit, but this is no excuse for their present state.

Another minor flaw is with the identification of the sample files. On the screen and in the program manual, the files have eight letter filenames. It would have been nice had the author expanded on filename descriptions in the manual. I'm still not sure which instrument is represented by the filename MGTRBNT3.

The addition of these instrument-set disks makes *SoundTrax* a more attractive and viable sound-sequencing alternative.

Loading in all of these new samples could take a lot of time. Thoughtfully, though, Sundog Systems has provided Config files that load samples into memory. There are six Config files, one for each side of the three instrument disks.

After sampling the new voices, you'll hear how much these new files add to music compositions. You now have greater flexibility with your musical creations. Instead of the sparse drum accompaniment, create full drum backbeats with the new tom-tom, cymbal, snare, hi-hat, and bass drum samples.

If you like guitars, you're in for a big surprise. The supplemental disks provide over 20 new guitar sounds. There are also 15 acoustic and electric piano samples. Some of the other instruments included are the bassoon, English horn, oboe, recorder, flute, whistle, woodblock, bongo, jingle bell and steel drum. Some humorous voice samples of laughing, sneezing, and a crowing rooster aroused a chuckle. With over 100 new samples, there is a little something for everybody to enjoy.

If you already enjoy using *SoundTrax*, just wait until you get these sets. As with the original sample files, the sound quality of the new sets is surprisingly good. And remember, if you still don't have that unique sound you've been looking for, it's possible to create samples with *Studio Works* and other similar digitizing packages on the market.

My two earlier criticisms of these new sets do not effect the sound quality of this package in any way, shape, or form. The addition of these instrument-set disks makes the original program, *SoundTrax*, a more attractive and viable sound-sequencing alternative.

(Sundog Systems, P.O. Box 766, Manassas, VA 22111; 703-330-8989; $12.95 per set, $29.95 for all three, plus $2.50 S/H)

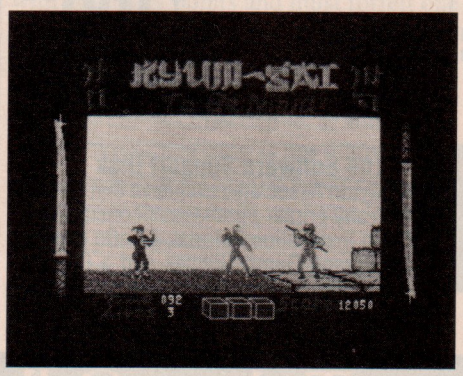
— Tony Olive

Game | OS-9 Level II

Kyum-Gai: To Be Ninja — in OS-9

Many people thought that porting a Disk BASIC arcade game to OS-9 while keeping the Hi-Res graphics intact would not be an easy feat. They never expected anyone would do it. If the game in mind were *Pong*, fewer people would have been as skeptical of a successful conversion. But, the game was not *Pong*, it was *Kyum-Gai: To Be Ninja*. *Kyum-Gai* is a marvel of game programming by Glen Dahlgren. About a year ago Glen announced his plans to port his game to OS-9. The CoCo community waited patiently.

Word was that Kevin Darling was making headway with the project, but previous commitments left him precious little time for working on *Kyum-Gai*. Kevin managed to get the bulk of the conversion process behind him. Glen, who wanted to get this landmark achievement on the market as soon as possible, found another programmer to fix the remaining loose ends. The



final touches to the port were added by Eddie Kuns. I take my hat off to Kevin Darling and Eddie Kuns for their marvelous accomplishment.

Kyum-Gai — OS-9 requires a 512K (actually, 256K minimum) CoCo 3 running OS-9 Level II. Due to Tandy licensing restrictions, an OS-9 boot file is not included on the *Kyum-Gai* disk. You need to boot OS-9 before playing this game.

Even this OS-9 neophyte had no problems loading the game. All that is necessary is that you create and move to a VDG window, set the data and execution directories, and enter `ninja`. Loading instructions and hard drive installation are clearly explained in the manual.

After the title screen credits you are greeted by the same real-time Hi-Res graphics animation and digitized sounds made popular by the original version. Simply put, there is no difference. For further information on game play, refer to the original review (December 1989, page 92).

The benefits of using the OS-9 version speak more for the operating system itself. You can multitask and have *Kyum-Gai* running in up to three windows on a 512K CoCo 3. Of course, you probably won't want to play three games simultaneously, but you get the idea. When you switch windows, the game automatically pauses until you return.

Perhaps this game offers another stepping stone for CoCoists who hesitate to delve into OS-9. This program has finally proven that fast-action arcade games are possible in the OS-9 environment. Sundog hopes *Kyum-Gai* spawns similar attempts of Disk BASIC/OS-9 version games.

(Sundog Systems, P.O. Box 766, Manassas, VA 22111; 703-330-8989; $29.95, plus $2.50 S/H)

— Tony Olive

Audio Tape

Mystical Data

About 10 years ago I experienced a project in San Francisco called Audium — an experiment in sound-sculptured space. People sat in a darkened room and listened to computer-generated sounds. The sounds, heard through a surround-sound speaker arrangement, created a presence of emotion that lent itself to vivid imagery.

Mystical Data, although different in the sense that there is distinguishable instrumentation, lulls the listener into the realm of imagination as well.

Mystical Data is a cassette tape recorded by Michael Milazzo. Using some high-tech musical equipment in conjunction with a Color Computer 3 sporting CoCo MIDI 3, he has produced a high-quality product.

The first track, "Lunar", produces a sense of floating in a zero-gravity environment.

The changes are subtle in this relaxing tune. Piano, drums, and synthesizers dominate the track. It flows on and on, producing a spacewalk feeling.

"Dragonslair", the next track, starts with a medieval opening. I immediately thought of dark, foreboding castles and stealthily journeying deep into the corridors of a cavernous mountain in search of the fair maiden who might be found resting on a treasure in the dragon's bane. There is a clock-like tick, or drip, throughout — very reminiscent of trickling stalactites — which lends a certain urgency to this song.

"Equinox", a more reflective passage, pulsates and sounds like a march. This one reminded me of the band Latitude, who use a Fairlight to achieve a similar calming affect with their music.

"Renaissance" begins with liquid bells and eerie wind swirls. This song sounded a bit more futuristic than charms from the days of yore. Though, again, the music is relaxing and a good source of soothing pleasure after a hectic day.

"Excursion", track number five, is aptly titled. The piece travels through three peaceful thematic ideas before returning to the main theme and gently fading away. All of the tracks on Side One should lower your blood pressure and set your mind at ease. If I had to categorize *Mystical Data*, it would fall somewhere in the New Age/Easy Listening music arena.

Side Two brings us to "Round Table 1990". At first I thought of a ballroom dance, but a flute or woodwind sound followed by electric brass changed the imagery to a woodland, or possibly a road leading to or from a modern-day Camelot. The fanfare hinted of a procession. Again, the winds of change swirled. Although there were no bird chirps or leaves falling, I felt this to be an autumn or winter song. This one put me in a reflective state.

"Moondrone", steady tapping of the high hat gets this hypnotic drone going. Don't expect any keyboard outburst (ala Emerson, Lake and Palmer) here. Instead, this piece provides more introspective passages, like those on Side One.

"Midnight Frost" has a haunting feel, much like the movie soundtrack to *Midnight Express*. The use of flutes and the overall rhythm make this piece sound somewhat Eastern in nature.

"Into the Light", the finale, opens with the tickling of keys and a seminary choir's lament. This piece has more discernable breaks and bridges. The changes were refreshing. My only criticism of this piece is that it is too short.

All songs on *Mystical Data* were conceived, performed, recorded, engineered, produced, and packaged by Michael Milazzo. Here is a list for those wondering what equipment he used for this recording:

Kawai K-1
Roland MKS-100
Yamaha FB01, RX17, R100
Vestafire and Boss digital and analog delays
Tandy CoCo 3 with CoCo MIDI 3
Real-time sequencer software
Tascam 244 Mixer, A2300SX ¼-track deck

Mystical Data is soothing mood music, not necessarily "elevator music" or Muzak. As I stated earlier, these songs will probably lower your blood pressure and help drain tensions. So, if you're going crazy tuning your radio dial past the screaming whammy bars and techno-pop garbage that has all but monopolized the airwaves, sit down with a cup of hot tea and take a load off with *Mystical Data*.

(Rulaford Research, P.O. Box 530328, San Diego, CA 92153; 619-690-1181; $9.95)

— Jamie Hensen

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Picture Bingo, a program requiring a Color Computer 3, disk drive, mouse or joystick, and DMP-105/107 or DMP-130/134 series printer. This program creates picture bingo cards and acts as the "caller" for the game. A Speech/Sound Cartridge may be used with this feature. *Picture Bingo* is fun for young children, has an educational application in helping students learn a foreign language and would make for a unique "party" game if the cards used personalized pictures. *E.Z. Friendly, 118 Corlies Avenue, Poughkeepsie, NY 12601; $19.95 plus $1.50 S/H.*

N*Banner, a banner-creating program requiring a CoCo, a 35-track disk drive, and a printer. Works on a 32, 40, or 80-column screen. Four fonts to choose from; Standard, Gothic, Digital and Standard Bold. Options include printing in double wide mode, using different graphics block codes, and selection of 600-9600 baud. *Johnson Software, 5803A Reinke, Crestview, FL 32536; $9.95.*

Caveman — In Quest of Kubai, graphics arcade game requiring a CoCo 3, an RGB monitor, a disk drive, and a two-button joystick. In the year 2061, after the great war, the human race has been destroyed, and only a few survivors remain. One of these survivors, the Evil Lord Dracus, has created a new race of robodroids, part machine, part human, that threaten the village and the good people of the land. In order to save humanity, you must rescue Kubai, the great wise man and professor, who is being held hostage in the underground caverns. *J.T. Rawlinson Software, #361 St. Germain Avenue, Toronto, Ontario, M5M 1W6, Canada; $14.95 plus $3 S/H.*

NIB Compressor, a graphics compressor for the CoCo 3. *NIB* allows you to save your HSCREEN pictures in a compressed format. *NIB* was used in the creation of CoCo Gallery on Disk for THE RAINBOW. Features include palette save, automatic save, fast compression, and fast loading. Use this as a stand-alone program or in conjunction with *Gallery Maker*. *Rick's Computer Enterprise, P.O. Box 276, Liberty, KY 42539; $2.50 plus $2 S/H.*

Gallery Maker, now you can create a personalized CoCo gallery on disk with your pictures and this program. *Gallery Maker* organizes your pictures, graphics data, and background information into a beautiful art gallery. Each finished gallery consists of eleven *NIB* pictures, a menu driver, and support files necessary to make the gallery complete. Requirements are a CoCo 3, a disk drive and an RGB or CMP monitor. *Rick's Computer Enterprise, P.O. Box 276, Liberty, KY 42539; $10 plus $2 S/H.*

Crystal City, a 128K/512K space-arcade game requiring a CoCo 3, a joystick, and a disk drive. It is the first commercial product to use the CoCo 3's horizontal hardware scrolling. Try to evade the evil overlords and penetrate level upon level of defenses to get close enough to free the enslaved people of the Crystal City. Written by Jeremy Spiller, author of *Zenix*. *Available from Sundog Systems, P.O. Box 766, Manassas, VA 22111; (703) 330-8989; $34.95 plus $2.50 S/H.*

CyberVoice, a versatile phoneme-based speech synthesizer using the Votrax SC-02 chip set. It offers independent control of the speech rate, pitch, pitch movement rate, amplitude, articulation rate, vocal tract filter response, and phoneme selection and duration. Included is a unique text-to-speech server program for the *CyberVoice*. This program executes in the background, cooperating with the *CyberVoice* device drivers, to translate ordinary English text into *CyberVoice* commands. Compatible with Speech Systems' *SuperVoice*. Requires a CoCo 3 and OS-9 Level II. *Burke & Burke, P.O. Box 733, Maple Valley, WA 98038; (800) 237-2409; $74.95 for Speech Synthesizer w/ OS-9 software; $24.95 for software only; plus $3 minimum S/H.*

The *Seal of Certification* is open to all manufacturers of products for the Tandy Color Computer, regardless of whether they advertise in THE RAINBOW.

By awarding a *Seal*, the magazine certifies the program does *exist* — that we have examined it and have a sample copy — but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW reviewers for evaluation.

Unwrapping the RAINBOW

Long time, no hear from, eh? The purpose of "Wrapping the RAINBOW" is to address changes in the magazine and other aspects of production that affect you. When I have nothing to report, I would rather free this page for other material. So, then, what *do* I have to report?

Starting with last month's issue (March 1991), we stopped using the plastic Sitma wrappers on THE RAINBOW. In making this decision, we looked at the history of our sending wrapped copies of the magazine. The original decision to "poly-bag" THE RAINBOW was in response to reader complaints about magazines getting destroyed in the mail. The number of complaints was relatively low; however, our goal is to serve you -- so, on with the wrappers. But, to make a long story short, the complaints continued.

We have tried several approaches to solve the problem, none of which were really effective. The post office offered many explanations for how this destruction might occur, but few point to anything other than careless handling. In our case, it doesn't appear the Sitma wrappers have much effect on this. So, our new way of handling the problem is to go back to the old way -- we'll replace *unusable* copies of the magazine that have been destroyed in the mail. The difference is that we'll also be putting the buck where it belongs, so to speak.

We have contacted the postal service and received assurance that they will do what they can to ensure proper delivery. If you receive a copy of THE RAINBOW you cannot read, let us know. We'll immediately fire off letters to the local and destination postmasters, the Postmaster General of the United States and the congressional representatives involved. In short, we'll be making a nuisance of ourselves any time we (or you) are not satisfied with the service. You should do the same. A big portion of the money you pay for a subscription to THE RAINBOW goes toward postage, which increased nearly 22 percent this February. So *do* let us know, but *you* complain to your postmaster, too. Every magazine we ship leaves here in good condition. In the meantime, we'll continue to serve those readers who encounter problems.

This doesn't mean we will never use the Sitma wrappers again. The plastic bags allow a greater number of options to advertisers. They are also very useful should we want to send supplemental information. But our experience has shown that using them as a regular course of action is not an effective means of ensuring you get your RAINBOW in good shape.

* * * * *

Our mail bag shows an increase in the number of questions being asked about OS-9. To handle the increase, we have decided to publish a new question/answer column in the magazine. "OS-9 Hotline" is intended as an open forum for your questions. It is our hope this column will provide a smoother entry for those just starting with OS-9. But we'll accept queries from intermediate and advanced users, too. While we don't guarantee we'll know all the answers, we'll give it our best shot and try to steer you in the right direction. Send your OS-9-related questions to OS-9 Hotline, c/o THE RAINBOW, P.O. Box 385, Prospect, KY 40059.

– Cray Augsburg

Continued from Page 6

RAINBOW had them. However, since their advertisements no longer appear, I have no idea if they are even still in business. That company was Datamatch, Inc., in Redford, Michigan.

I finally resorted to making my own flippy disks. In addition to the second notch, it is necessary to punch a second index timing hole. To do this, it is necessary to measure and mark the exact location (on both sides of the disk) of the second hole. (It is simple enough to find this spot by referring to the existing index timing hole. The new one is on the opposite side of the large center hole.) Then, using a single-hole paper punch, carefully punch a hole in the plastic cover. Do not punch the magnetic disk, or you will ruin it! Also, be careful not to handle the disk, don't even let the punch touch it if you can possibly avoid it. Punch the second hole on both sides of the disk cover.

I have been very successful in making my own flippy disks with this method. I am sure there are several experts who advise you not to do it, but the method works. It is like having twice as many disks as you had previously.

I might also advise you should be sure the disks you buy are DSDD disks. Although the SSDD disks can be altered to become flippy disks, the manufacturer guarantees only the one side to be top quality. In other words, convert the SSDD disks at your own risk.

I hope this information helps Roger and anyone else who may have had the same problem. I strongly feel that, as readers of THE RAINBOW, we need to come to the aid of one another. As Radio Shack seems to be phasing out our beloved CoCo, we need THE RAINBOW and each other.

It is obvious that THE RAINBOW and its various advertisers are doing their part. Let us hope that we are doing ours. Keep the CoCo alive!

Bill Swartz
Washington, D.C.

To the best of our knowledge, no data exists regarding the effects of rotating a disk in both directions (as must be done with flippies). It would seem that dirt picked up by the disk while going one way could be imbedded in, or scratch, the disk when moved in the opposite direction. In any case, we recommend caution and common sense should anyone decide to follow this practice.

Printer Selections

Editor:

Since the DMP-107 replaced the DMP-106 in Radio Shack's printer line, some CoCo users have been trying to use graphics software by selecting DMP-106 printer drivers. As it turns out, this does not work.

The DMP-107 Tandy Graphics modes seem to be the same as the DMP-130, not the DMP-106. Zebra's *CoCo Graphics Designer Plus*, *Label Designer*, and *First Prize* all give excellent results using the DMP-130 printer driver for the DMP-107 printer.

DMP-107 owners will, no doubt, find that DMP-130 printer drivers on other vendor's graphics software also support their printer.

Stewart Newfeld
President, Zebra Systems, Inc.
State College, Pennsylvania

Many thanks for the tip, Stewart.

A Helping Hand for *Home Publisher*

Editor:

I received my January issue of THE RAINBOW this week and, as usual, began by reading the "Letters to THE RAINBOW". I would like to reply to Douglas Bacon and Sanceria Thomas.

I have *Home Publisher* and have run into many of their problems. Though my system has more on it than either of their descriptions, the key factors are the same: I have a CoCo 3 and a DMP-133 printer. Both Doug and Sanceria can solve most of their problems by reading Appendix E in the manual. *Home Publisher* comes with the driver for a DMP-13x installed. The x is because this driver works in the Tandy mode for the 130, 130a, 132, and 133. Doug's problem stems from the fact that the printer (not the software) is limiting him to two columns of the three-column mode and creating a problem with the single-column mode. According to the information in a file referenced by Appendix E, Doug should cure his problem by setting the printer to Tandy mode, IBM character set, setting the printer to take advantage of his parallel interface and installing the DMPibmn printer driver. (Read on for installation information.) If he wants to continue using the DMP-130n driver and the serial interface, there are special settings for the single-column mode to coax it into working with this printer driver. (See the file AppendE on Side 2 of the original disk.)

Sanceria's problem may come from having the DMP-130 driver installed when in fact the DMP-105 driver may need to be installed. To find out which driver is currently installed, and to change it as required, click on the Options area. Next click System Set-up. Then click Printer Definitions. Finally, click Printer Driver. A small window opens, stating the current driver. If you've changed nothing since purchasing the software, it will be the DMP-130n driver. Below this window another window opens. This contains the menu of available drivers. Click on the appropriate driver as mentioned above. The software now changes the file that sets up the system when you boot the software. Unless I have misguessed, this should cure the problems with *Home Publisher*, or at the very least cause it to run in a more predictable manner.

Sanceria's second problem is trying to get the Color Computer to act as a typewriter. Even though there have been programs published as *One-liner* entries in THE RAINBOW that accomplish this conversion, I can never find the one I want when I need it. I agree that what Sanceria is really looking for is a word processor. An OS-9-based text editor or word processor would allow direct importation of text into *Home Publisher*. As an exercise in learning why text editors and word processors cost what they do, and to meet Sanceria's stated goals, type in the program on Page 191 of the "Color Computer Extended BASIC" manual. Then flip the page and follow the instructions on Page 192 that modify the program to output to the printer rather than the screen. This allows very limited editing (as long as you edit before you press ENTER) and allows printing of text to the printer without having to imbed the text in data statements.

Good luck to both of you. One last comment to Sanceria. When you meet someone (or something) new, the relationship cannot be as friendly as it becomes once you become better acquainted. As the Editor replied, "hang in there." Read the manuals, try the examples, and above all give yourself the time to learn. Don't you let that fire of eagerness turn to frustration. Relax! The dawn will come if you just keep at it.

Alan J. Wagner, Sr.
Quakertown, Pennsylvania

THE RAINBOW welcomes letters to the editor. Mail should be addressed to: Letters to Rainbow, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for purposes of clarity or to conserve space.

Letters to the editor may also be sent to us through our Delphi CoCo SIG. From the CoCo SIG> prompt, type RAI to take you into the Rainbow Magazine Services area of the SIG. At the RAINBOW> prompt, type LET to reach the LETTERS> prompt and then select Letters for Publication. Be sure to include your complete name and address.

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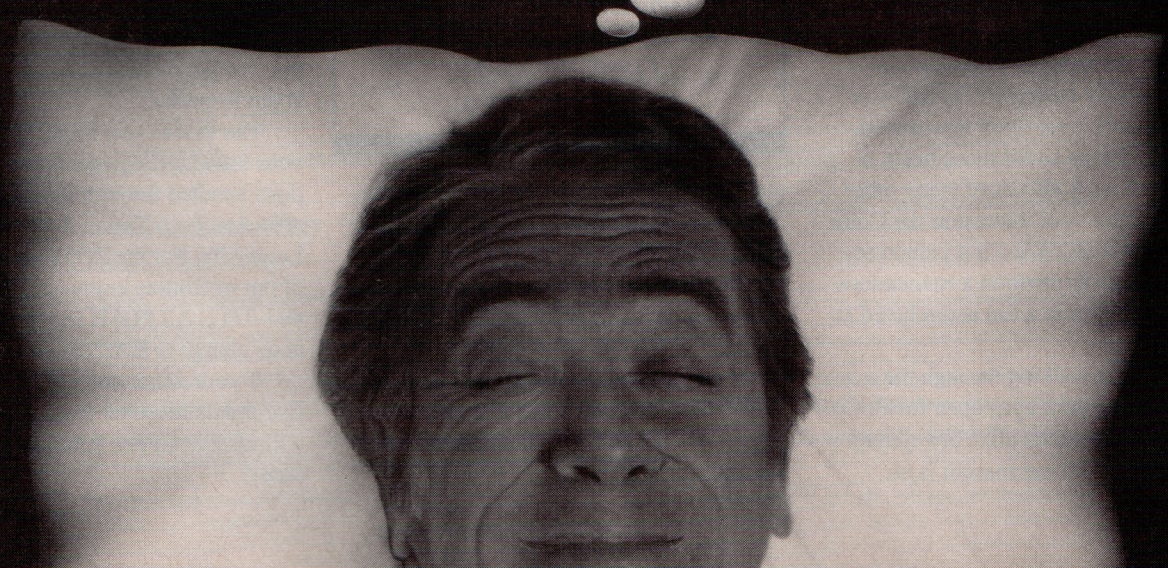

GIME Chicago '91!

For over 10 years, THE RAINBOW has been bringing RAINBOWfest to the CoCo Community. Being our 20th consecutive show, this RAINBOWfest promises to be a show to be talked about for time to come.

Come and walk the aisles — set your own pace between visiting the exhibits and attending the many invaluable, free seminars. Take part in the seminars offered, ranging in topics from BASIC to the sophisticated OS-9 operating system.

Stop by the RAINBOW booth and meet the faces behind THE RAINBOW. As well, those who are written about throughout its pages will be there to meet you and answer your questions. While you're at the RAINBOW booth, you can also take advantage of the reduced prices on the entire RAINBOW bookshelf. In addition, prices on all back issues will be reduced, giving you a chance to fill those holes in your library. You'll also meet many other people who share your interest in the Color Computer. RAINBOWfest is a person-to-person event, not to mention a tremendous learning experience in a fun and relaxed atmosphere.

While you're walking through the exhibit hall, keep your eyes open for CoCo Cat. Children and adults alike always enjoy the furry feline. And our mascot is no dummy — always looking for great deals, perhaps CoCo Cat has a hot tip for you.

RAINBOWfest is the place where commercial programmers show their newest programs and hardware for the first time. Plus, they will be listening to your comments and offering "special show prices." RAINBOWfest Chicago, is *the* place to get information on the capabilities of the CoCo, and find a terrific selection of the latest CoCo products. In exhibit after exhibit, there will be demonstrations, opportunities to try software and hardware, and special RAINBOWfest prices.

If you missed the fun at our last RAINBOWfest, why don't you make plans to join us in Chicago? For those members of the family who don't share your affinity toward the CoCo (for reasons we will never understand), there are many other attractions in the Chicago area.

Once again we are pleased to be holding RAINBOWfest at The Hyatt Regency-Woodfield, Schaumburg, Illinois. The show opens Friday evening with a session from 7:00 p.m. to 10:00 p.m. It's a daytime show Saturday - The CoCo Community Breakfast (separate ticket required) is at 8:00 a.m. sharp, and the exhibit hall opens promptly at 10:00 a.m. and runs through 5:00 p.m. On Sunday, the exhibit hall opens at 11:00 a.m., and the show closes at 3:00 p.m.

Tickets for RAINBOWfest may be obtained directly from THE RAINBOW. We'll also send you a reservation form so you can get a reduced room rate at the Hyatt Regency.

The POSH way to go. You can have your travel arrangements and hotel reservations handled through RAINBOW-affiliated Posh Travel Assistance, Inc., of Louisville. For the POSH treatment many of our exhibitors enjoy, call POSH at (502) 893-3311. All POSH services are available at no charge to RAINBOWfest attendees.

If your ticket order is one of the first five orders received from your state, you will receive a **Free RAINBOWfest T-Shirt!**

Show Information

RAINBOWfest - Chicago

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Make checks payable to: RAINBOWfest, The Falsoft Building, 9509 U.S. Highway 42, P.O. Box 385, Prospect, KY 40059. To make reservations by phone, in Kentucky call (502) 228-4492, or outside Kentucky call (800) 847-0309.

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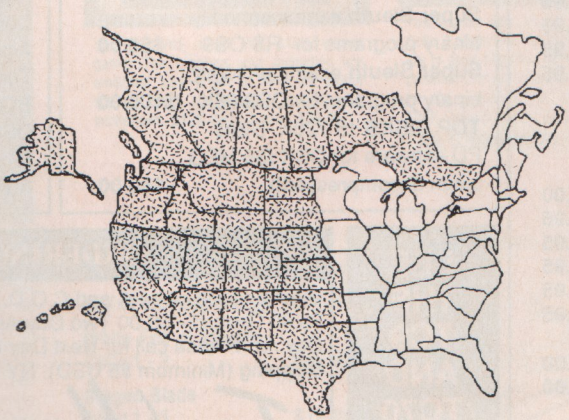

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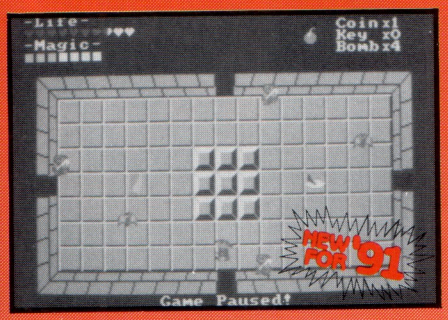
NEW FOR '91

SUNDOG SYSTEMS

The Quest for THELDA



Better men than you have failed the quest, but the hand of the good princess Thelda is too much to resist! Stolen by the evil necromancer Divinax, she has been secreted far from prying eyes and it is now up to you to regain the pieces of the mystical Life Force and save the fair lady. The Quest for Thelda is an outstanding arcade program that combines action and adventure to bring you an incredible video game playing experience. Travel throughout over 500 different screens searching for magical objects and spells, fighting horrible creatures, and gathering the various parts of the Life Force guarded by ever-increasing terrors. You'll enjoy the highest quality 320x200 resolution 16 color graphics and digital sound effects that you've come to expect from Sundog Systems. The game play is fast and furious, and only you can rescue the princess and complete the **LEGEND OF THELDA!** Req. 128K CoCo 3, disk drive, and joystick (2-button joystick supported).

$34.95

Hint book now available for Thelda! Contains clues, maps, and even a BASIC program to modify your own characters! **$4.95**

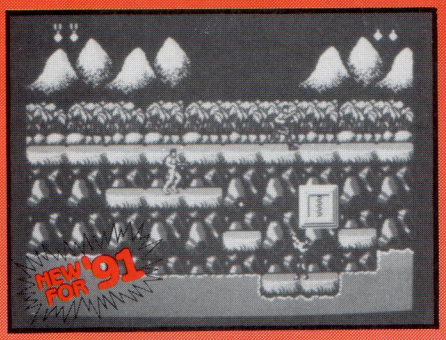
Zenix

You have been chosen to pilot the spacecraft wielding the plutonium plasma laser against the nefarious insectoids, the Zenians. These bugs have been ripping off the space trade lines for years; now they're about to find a victim who can fight back! Beat back the swarm of pests to their home planet Zenix, and use the laser to end the menace once and for all. Zenix is a lightning fast arcade game for the 128K CoCo 3. The 320x225 16 color graphics are amazing, as are the digital background music score and effects, all on a 128K computer! The fast action and game play will astound you in this GALAGA of extermination. Plug in your joystick and strap in for the ride of your life! Call to order a demo disk to see the action before you buy! Req. 128K CoCo 3, disk drive, and joystick.

$29.95

Visa, Mastercard, Check, Money Order, and COD (USA only, please) accepted. All foreign orders must be sent in US currency Money Orders. Include $2.50 for shipping in USA and Canada. $5.00 Foreign. $3.00 extra for COD orders. PA residents add 6% sales tax. Dealer inquiries welcome. Authors: we're looking for new software!

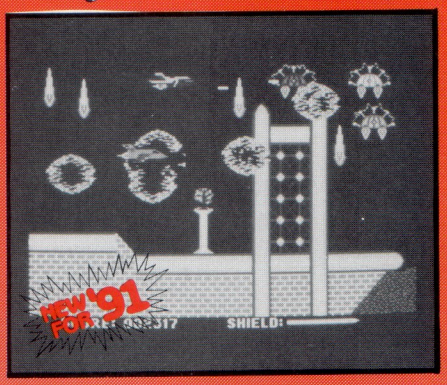
★ THE CONTRAS ★



In the year 2671, a mysterious object landed on Earth, heralding the alien invasion of the Red Falcon. Only two courageous soldiers have a hope of stemming this alien infestation. Armed with your military training and the latest weapon technology, you and a friend must fight back the horde. Sundog Systems presents our second 512K game, **The Contras.** You'll see why we decided to use 512K on this project! Amazing graphics with 320x225 resolution, 16 color full screen animation and horizontal smooth scrolling! Background digital sound effects and real-time music! One or two player action AT THE SAME TIME! You'll agree that this is one of the best arcade games yet for your 512K CoCo 3. Needless to say, playing hero won't be easy; playing The Contras will be tougher! Req. 512K CoCo 3, disk drive, and 2-button joystick.

$34.95

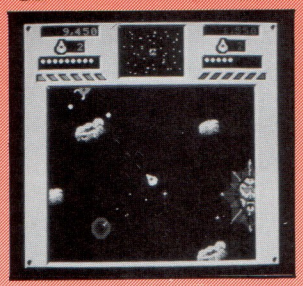
Crystal City



The superior technology of the evil Overlords has ensnared yet another innocent planet; however, this one contains the Crystal City, bastion of democracy and independence. Earth has had enough! Break through level upon level of their virtually invulnerable defenses, defeat the end guardians, and make your way ever closer to freeing the slaves of the Crystal City! This amazing arcade game is an achievement in its own right. Full 128K/512K utilization! Super fast horizontal hardware scrolling on the 128K computer! Wild digital sound effects and background music score! 30 minutes, or over 30 megabytes, of non-repeating 320x200 resolution, 16 color graphics! This game has it all; order a demo disk to see it first! Can you save the Crystal City from unbeatable foes? Req. 128K CoCo 3, disk drive, and joystick.

$34.95

SinistaaR



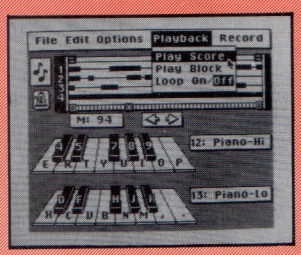
You've raved about this 512K arcade game! The graphics and animation are amazing! You've got to hear the digital sounds! 512K (three disks) packed with excitement. 512K CoCo 3 only. $34.95

KYUM-SAI TO BE NINJA

This martial arts arcade game remains a CoCo 3 phenomenon. One of our best sellers to date! Play the incredible combat experience that you've been missing, and call for the availability of the OS-9 version. 128K CoCo 3 action. $29.95.

OS-9 Version Now Available

SOUNDTRAX



This 128K/512K sound sequencing system has become an immensely popular program. Create musical scores using polyphonic digitized sounds and a user-friendly point and click editor. Call to order the SoundTrax demo program, and get 10% off your purchase with receipt. $34.95

Now Available: SoundTrax instrument sample disks! Guitars, strings, woodwinds, and just plain weird instruments for your composing pleasure. Completely compatible with the SoundTrax system. 3 flippy (2 sides) disks full of sounds. $12.95 each or $29.95 for all three.

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